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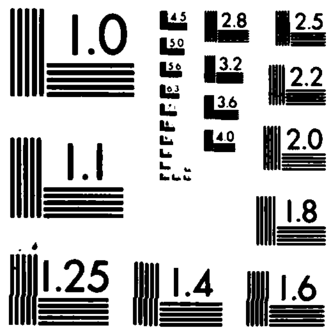

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FINAL REPORT

STUDIES ON LIGHT SCATTERING AND ABSORPTION PROPERTIES OF ICE CLOUDS FOR VISIBLE AND INFRARED LASER WAVELENGTHS

F49620-79-C-0198

K. N. LIOU
DEPARTMENT OF METEOROLOGY
UNIVERSITY OF UTAH
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This letter report summarizes the results of experimental evaluations of angular scattering and absorption by ice particles of CO_2 laser radiation at 10.6 micrometers wavelength. Experimental results are presented which summarize particle effects such as spontaneous fragmentation and changes in the growth habit. These are compared to model predictions to determine effects upon the backscattered radiation, and polarization. A scattering model is presented which involves complete polarization information for arbitrarily oriented hexagonal columns and plates. It is discussed that a computational technique was developed for randomly oriented hexagonal cylinders and spheroids which show general agreement for phase functions of these geometric sizes and shapes except for the twenty-two and forty-six degree halo features and the backscattering maximum. An attachment to the letter report presents graphed and tabulated data for phase matrix elements for laser wavelengths of .55, .6328, .7, 1.3, 3.8 and 10.6 micrometers based on model calculations.

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22a. NAME OF RESPONSIBLE INDIVIDUAL: Ted S. Cress, Lt Col, USAF

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August 8, 1983

Lt. Col. Ted S. Cress, Program Manager
Directorate of Chemical and Atmospheric Sciences
Air Force Office of Scientific Research (AFSC)
Bolling Air Force Base
Washington, D.C. 20332

Subject: Final Report for AFOSR Contract F49620-79-C-0198

A-1

Dear Col. Cress:

The research project entitled "Studies on Light Scattering and Absorption Properties of Ice Clouds for Visible and Infrared Laser Wavelengths" has been supported by AFOSR under the above contract number from 1 June 1979 to 30 December 1982. The research accomplishments during this period may be divided into experimental and theoretical phases.

On the experimental side, three papers have been published in the area of the propagation of CO_2 laser radiation through clouds consisting of ice crystals and water drops. First, measurements of the angular scattering and exctinction of 10.6 μm laser radiation in laboratory water and ice clouds were carried out and compared with theoretical predictions for spheres. Strong internal energy absorption was found in the experiment. Dual-wavelength extinction measurements reveal information on the growth and dissipation of laboratory water clouds and the effects of cloud seeding. Secondly, experiments on 10.6 μm CO_2 laser beam-ice crystal interactions revealed the disruptive nature of laser energy to ice cloud content under some conditions due to high internal absorption of ice with respect to this wavelength. Observed effects resulting from CO_2 laser irradiance range from the instantaneous fragmentation of large crystal branches to changes in the habit of growing ice crystals. Thirdly, measurements of the evaporation rate of water drops with diameters on the order of 1-2.5 mm suspened in a CO_2 laser beam have been carried out using an optical technique. The results illustrate a time rate of change of drop radius on the order of 1.6 μm sec^{-1} increase over the natural evaporation rate produced by 10.6 μm energy absorption at an irradiance of ~1.65 W m^{-2}. In addition, examination of the ability of planar ice crystals to assume horizontal orientations during fall as a function of crystal diameter was performed. It is concluded that the prediction for stable fall in terms of Reynold's number (Re) through the range $1 < Re < 100$ is generally valid in the atmosphere and that crystal diameters greater than 0.1-0.2 mm are required to generate the optical displays.

With respect to theoretical accomplishments, one review paper and four research papers have been published. The review article was concerned with

the current understanding of the light scattering properties of ice crystals and radiative characteristics of ice clouds (up to 1981). The significance of light scattering and radiative properties of ice crystals were discussed in relation to remote sensing and climate applications. One of the theoretical papers proposed a time-dependent transfer model for multiple backscattering involving a pulsed laser beam and clouds. The theory developed included a general four-by-four scattering phase matrix and required no specific physical approximations. Using laser wavelengths of 0.7 and 10.6 μm, we investigate the effects of the transmitter beam width and receiver field-of-view on the multiple backscattered return, depolarization and polarization characteristics. Three papers are associated with the study of light scattering by hexagonal ice crystals. In one of these papers, we have developed a scattering model involving complete polarization information for arbitrarily oriented hexagonal columns and plates on the basis the ray tracing principle which includes contributions from geometric reflection and refraction and Fraunhofer diffraction. A traceable and analytic procedure for computation of the scattered electric field and the associated path length for rays undergoing external reflection, two refractions and internal reflections was developed. An analytic expression was also derived for the scattering electric field in the limit of Fraunhofer diffraction due to an oblique hexagonal aperture. Results of the six independent scattering phase matrix elements for randomly oriented large columns and small plates, having length-to-radius ratios of 300/60 and 80/10 μm, respectively, demonstrated a number of interesting and pronounced features in various scattering angle regions using a laser wavelength of 0.6328 μm. Comparisons of the computed scattering phase function, degree of linear polarization and depolarization ratio for randomly oriented columns and plates with experimental scattering data obtained by Sassen and Liou (1979) for small plates show close agreements, especially for the depolarization ratio. This paper represents a fundamental contribution to the field of light scattering by nonspherical particles. Using the computational technique developed in this paper, we further carried out comparisons with results calculated from the T-matrix method for randomly oriented hexagonal cylinders and equivalent spheroids. Using a wavelength of 0.7 μm and size parameters of ~25, we show that there is general agreement for the phase functions for hexagonal cylinders and spheroids with the same overall dimensions or surface area, except for the 22 and 46° halo features and the backscattering maximum. The linear polarizaton component differs in the forward directions where hexagonal cylinders have two positive polarization maxima. Large differences are found in the other matrix elements.

A list of the papers relevant to the above contract is attached in this report. We would like to thank the AFOSR and AFWL for the continuous support over a number of years from which significant advances of our knowledge and understanding on light scattering and absorption by ice

crystal clouds have progressed.

Respectfully submitted,

Kuo-Nan Liou
Professor

cc: Lt. Col. Gary Thompson
Madelene Weinberger
Dr. Kenneth Sassen

Encl.

KNL/sb

List of Publications

1. Sassen, K., 1980: Remote sensing of planar ice crystal fall attitudes. Journal of the Meteorological Society of Japan, 58, 422-430.

2. Sassen, K., 1981: Infrared (10.6-μm) scattering and extinction in laboratory water and ice clouds. Applied Optics, 20, 185-193.

3. Coleman, R.F. and K.N. Liou, 1981: Light scattering by hexagonal ice crystals. Journal of the Atmospheric Sciences, 38, 1260-1271.

4. Sassen, K., 1981: Infrared (10.6-μm) radiation induced evaporation of large water drops. Journal of the Optical Society of America, 71, 887-891.

5. Sassen, K. and M. Griffin, 1981: Propagation of CO_2 laser radiation through ice clouds: Microphysical effects. Journal of Applied Meteorology, 20, 828-834.

6. Cai, Q. and K.N. Liou, 1981: Theory of time-dependent multiple back-scattering from clouds. Journal of the Atmospheric Sciences, 38, 1452-1466.

7. Liou, K.N., 1981: Some aspects of the optical properties of ice clouds. In Clouds: Their Formation, Optical Properties, and Effects, Academic Press, 315-359.

8. Cai, Q. and K.N. Liou, 1982: Polarized light scattering by hexagonal ice crystals: Theory. Appled Optics, 21, 3569-3580.

9. Liou, K.N., Q. Cai, P.W. Barber and S.C. Hill, 1983: Scattering phase matrix comparison for randomly hexagonal cylinders and spheroids. Applied Optics, 22, 1684-1687.

STUDIES ON LIGHT SCATTERING AND ABSORPTION PROPERTIES OF ICE CLOUDS FOR VISIBLE AND INFRARED LASER WAVELENGTHS

K.N. Liou and Mike Griffin

Department of Meteorology
University of Utah
Salt Lake City, Utah 84112

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1. This report presents graphs for the normalized phase function as a function of the scattering angle and table listings for single scattering parameters and six phase matrix elements.

2. Research effort contained in this report has been supported in part by the Air Force Office of Scientific Research under contract F49620-79-C-0198.

Figure Captions

Fig. 1. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal columns (with length ℓ and radius a of 300 and 60 μm, respectively) illuminated by a laser wavelength of 0.55 μm.

Fig. 2. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal plates (ℓ/a = 8/10 μm) illuminated by a laser wavelength of 0.6328 μm.

Fig. 3. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal columns (ℓ/a = 5/1 μm) illuminated by a laser wavelength of 0.7 μm.

Fig. 4. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal plates (ℓ/a = 2/2.5 μm) illuminated by a laser wavelength of 0.7 μm.

Fig. 5. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal columns (ℓ/a = 300/60 μm) illuminated by a laser wavelength of 1.3 μm.

Fig. 6. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal columns (ℓ/a = 300/60 μm) illuminated by a laser wavelength of 3.8 μm.

Fig. 7. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal columns (ℓ/a = 300/60 μm) illuminated by a laser wavelength of 10.6 μm.

Fig. 8. Normalized scattering phase function as a function of scattering angle for randomly oriented hexagonal plates (ℓ/a = 30/37.5 μm)

illuminated by a laser wavelength of 10.6 μm.

Fig. 9. Scattering phase function comparisons for randomly oriented plates (ℓ/a = 30/37.5 μm) and columns (ℓ/a = 300/60 μm) illuminated by a laser wavelength of 10.6 μm (ref. Figs. 7 and 8).

Fig. 10. Scattering phase function comparisons for randomly oriented plates (ℓ/a = 2/2.5 μm) and columns (ℓ/a = 5/1 μm) illuminated by a laser wavelength of 0.7 μm (ref. Figs. 3 and 4).

Fig. 11. Scattering phase function comparisons for randomly oriented columns (ℓ/a = 300/60 μm) illuminated by laser wavelengths of 0.55 (0.7), 1.3, 3.8 and 10.6 μm.

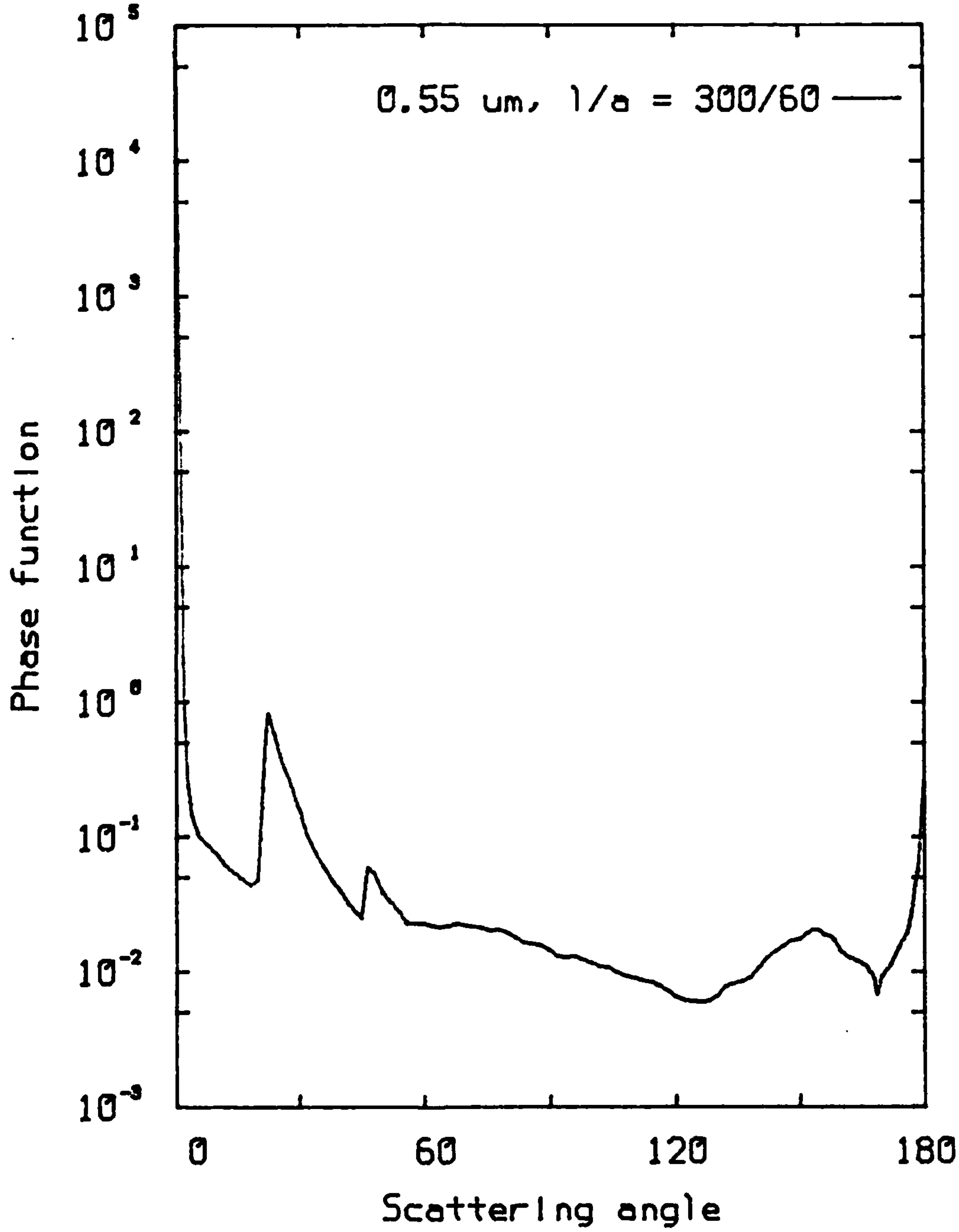


Fig. 1

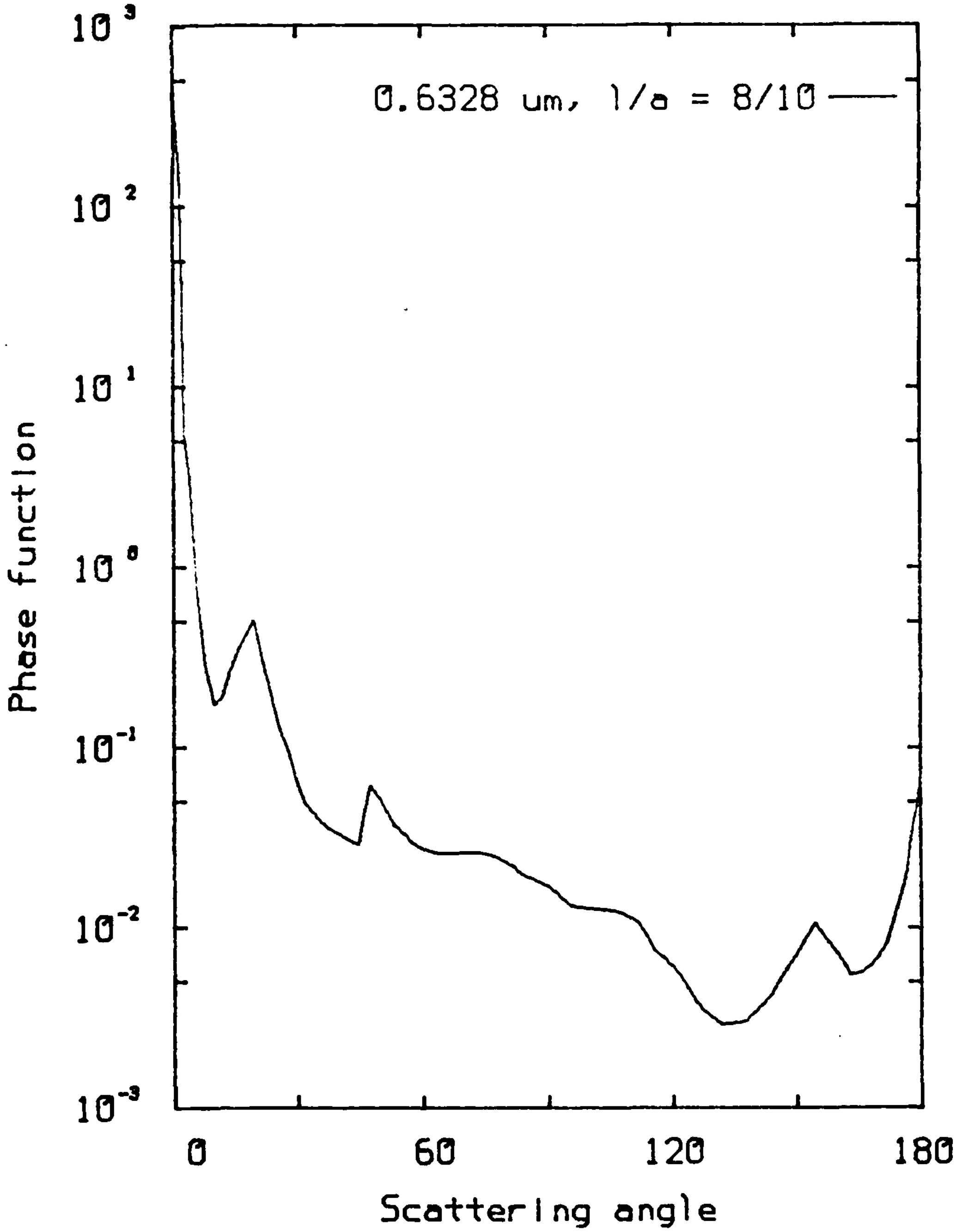

0.6328 um, l/a = 8/10
Phase function
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
0
60
120
180
Scattering angle

Fig 2

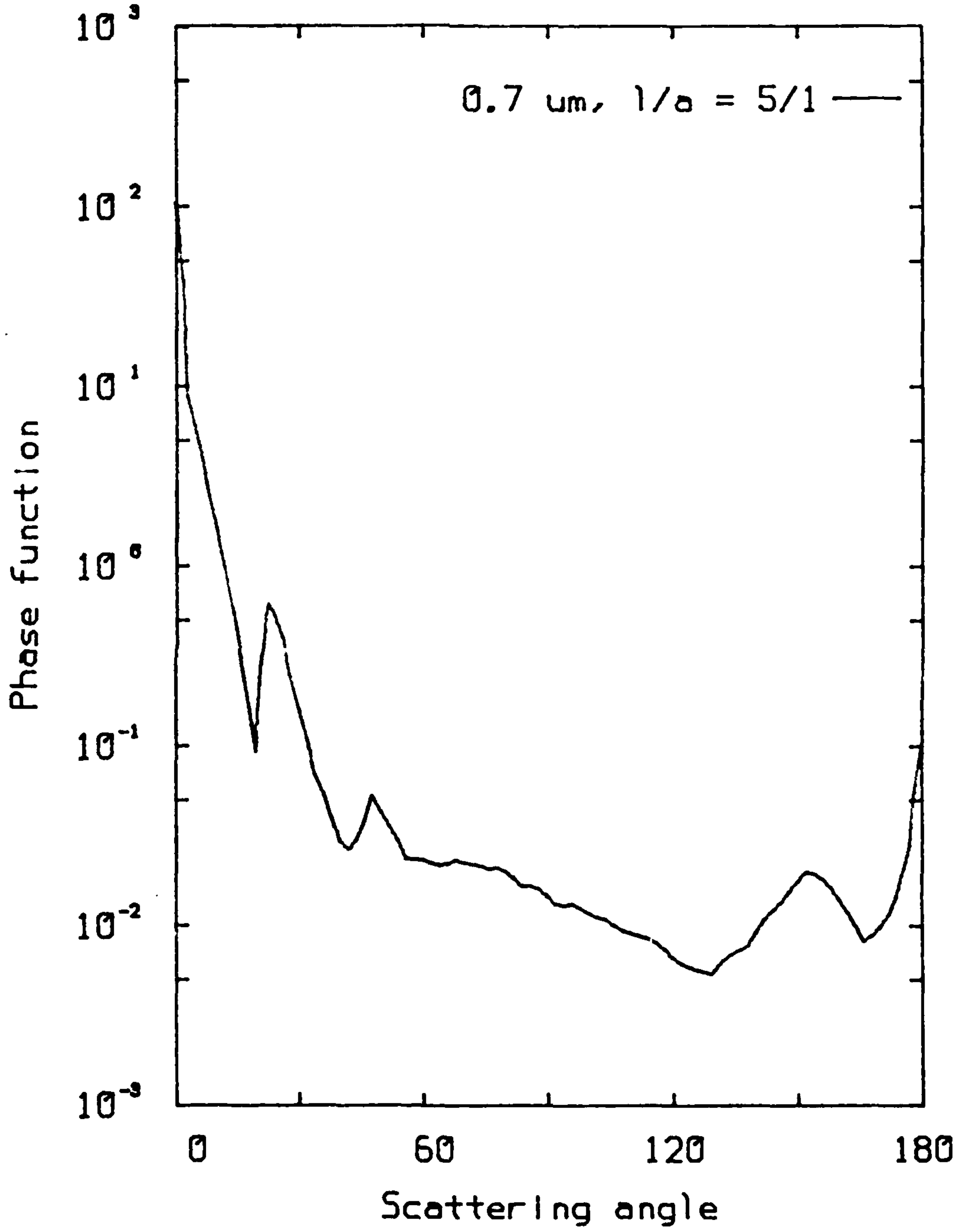
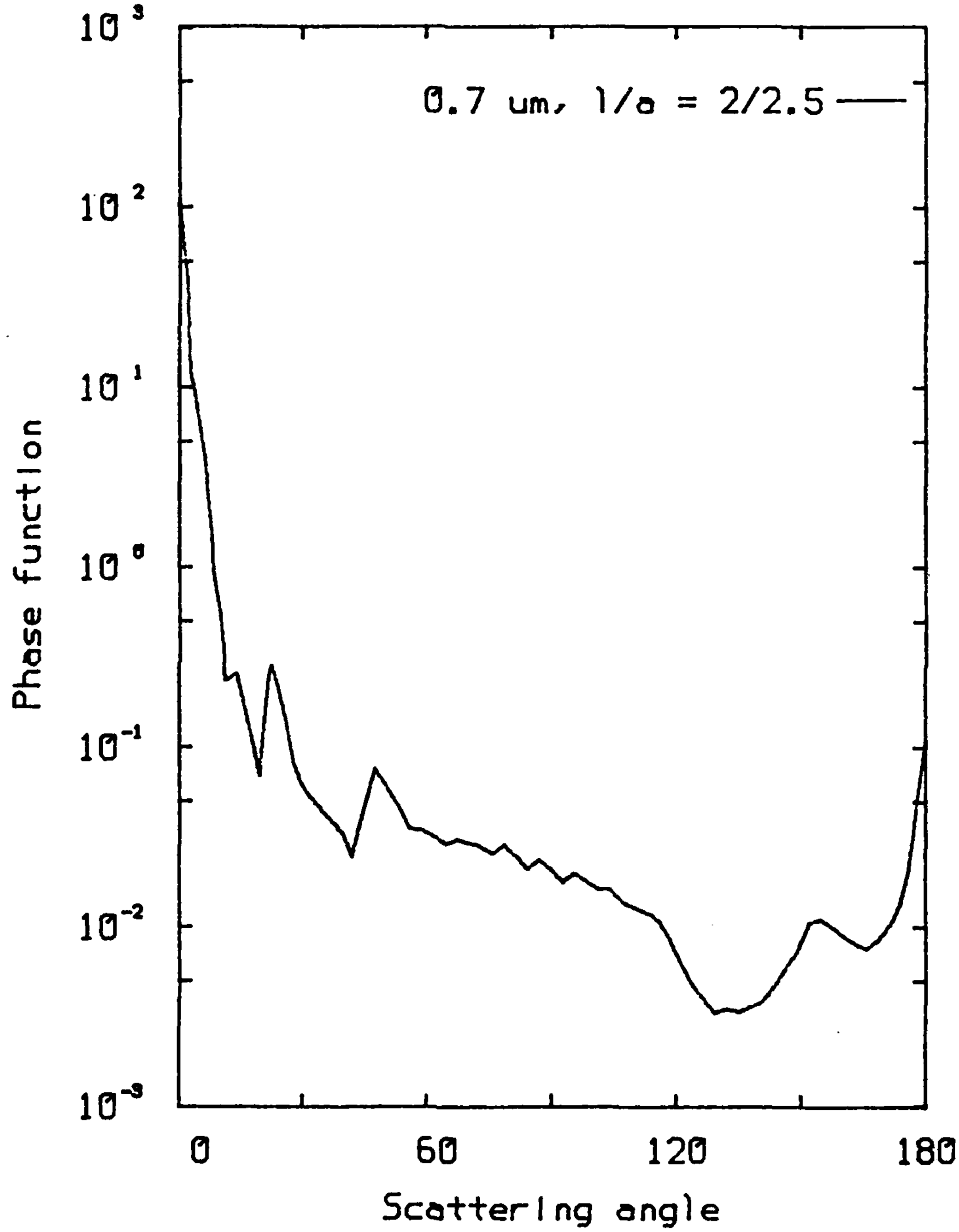
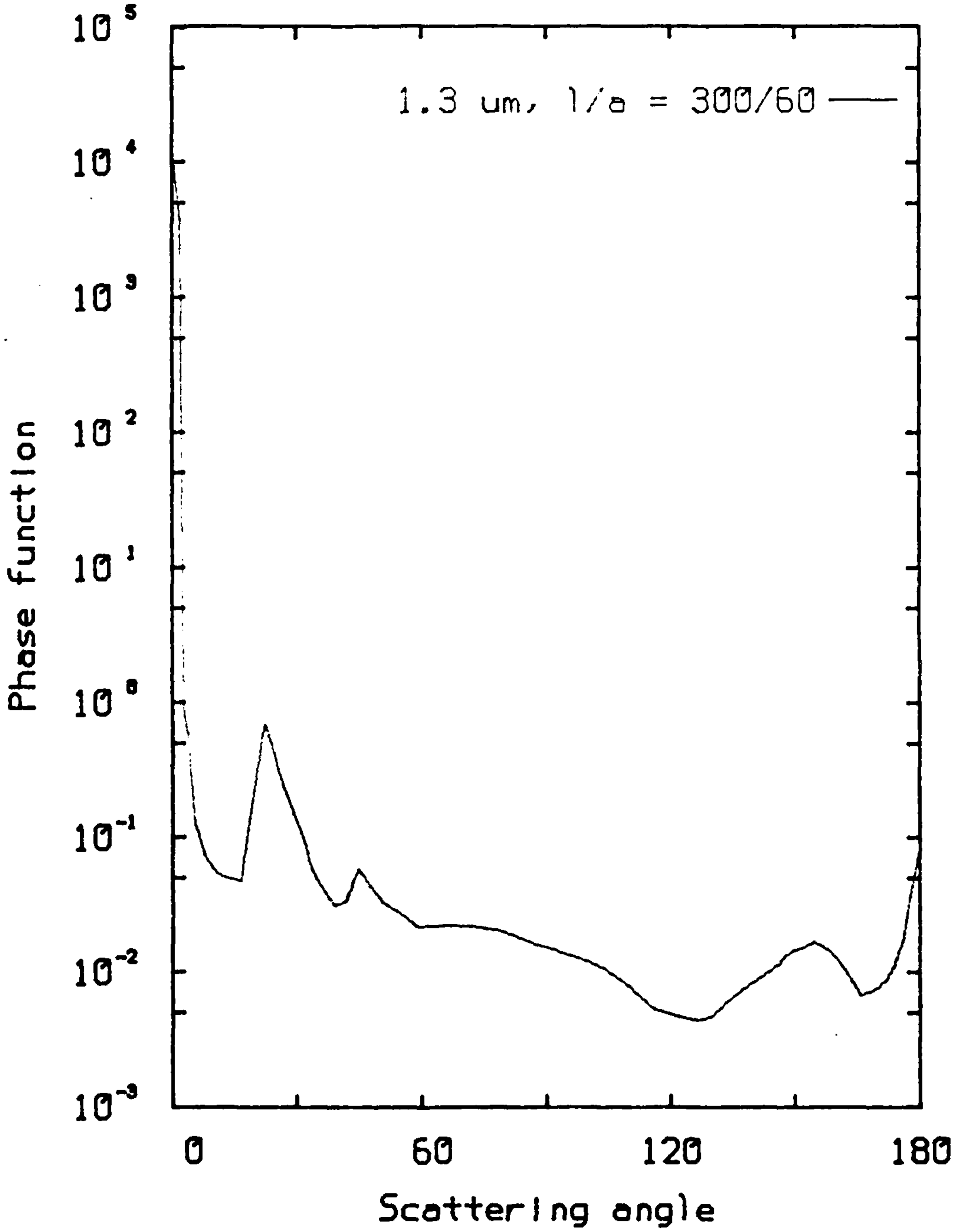

0.7 um, l/a = 5/1
Phase function
10^3
10^2
10^1
10^0
10^{-1}
10^{-2}
10^{-3}
0
60
120
180
Scattering angle

Fig. 3



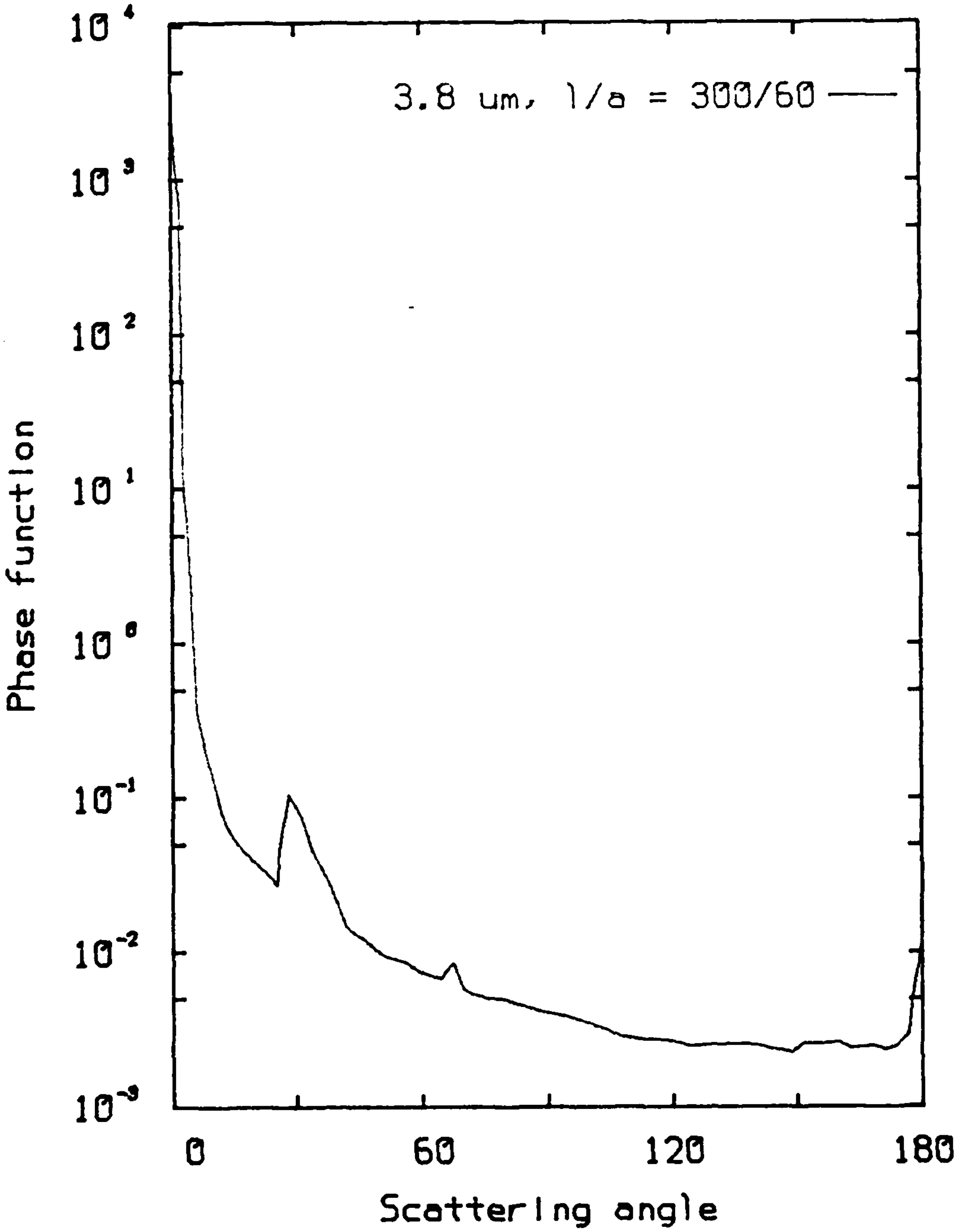
0.7 um, 1/a = 2/2.5
Phase function
Scattering angle
10³
10²
10¹
10⁰
10⁻¹
10⁻²
10⁻³
0
60
120
180

Fig 4



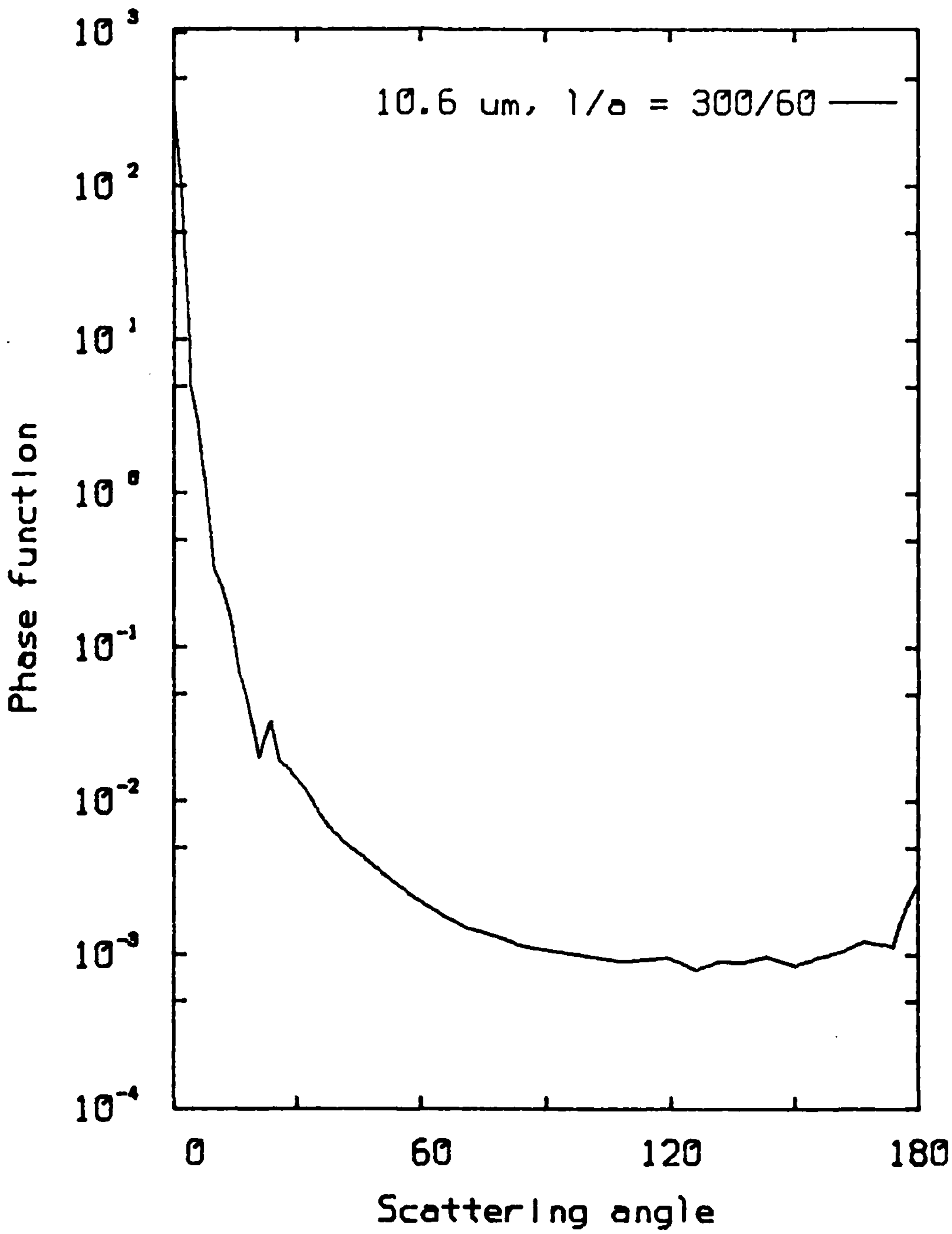
10^5
10^4
10^3
10^2
10^1
10^0
10^{-1}
10^{-2}
10^{-3}
1.3 um, l/a = 300/60
Phase function
0
60
120
180
Scattering angle

Fig. 5



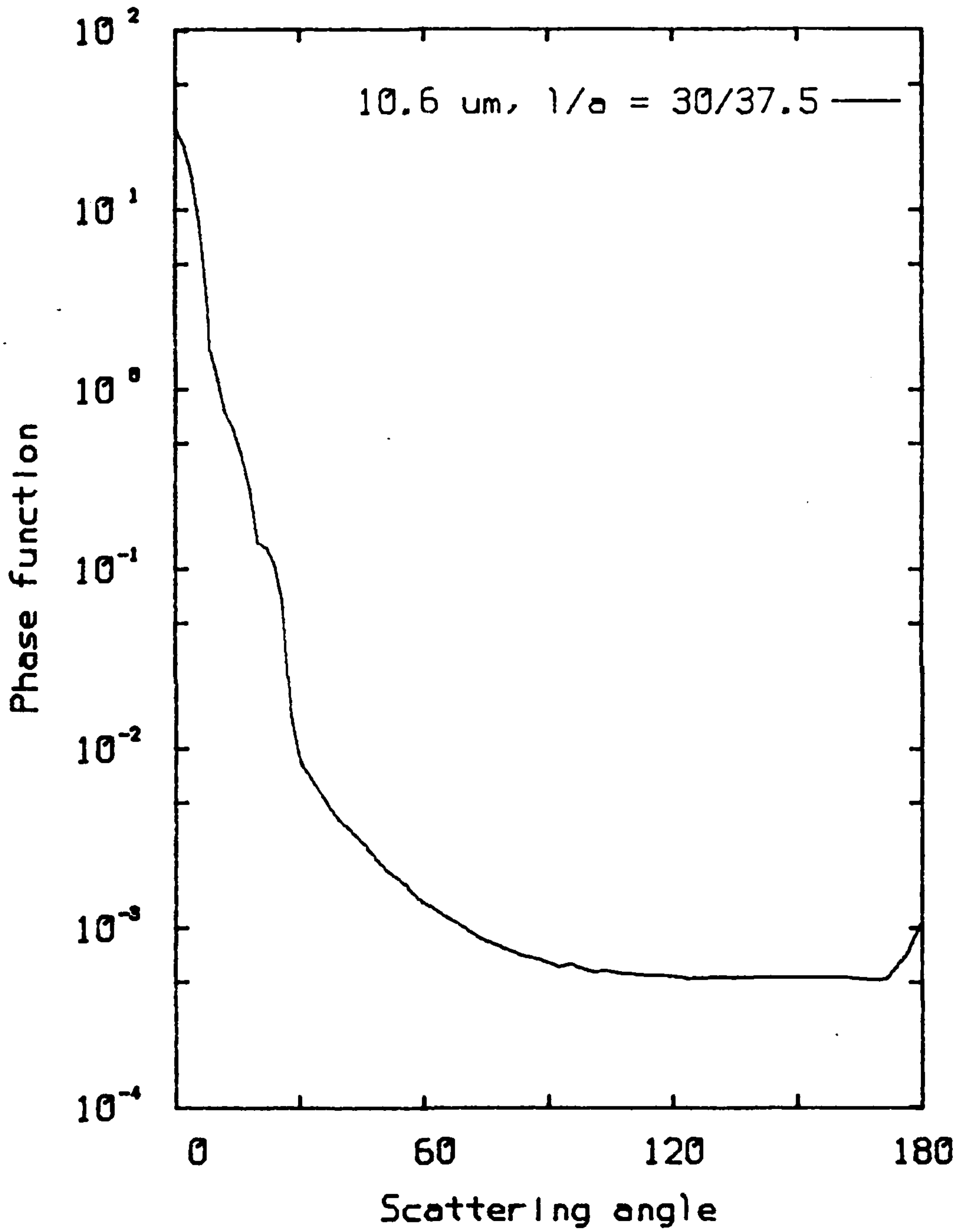
3.8 um, l/a = 300/60
Phase function
10 4
10 3
10 2
10 1
10 0
10-1
10-2
10-3
0
60
120
180
Scattering angle

Fig. 6



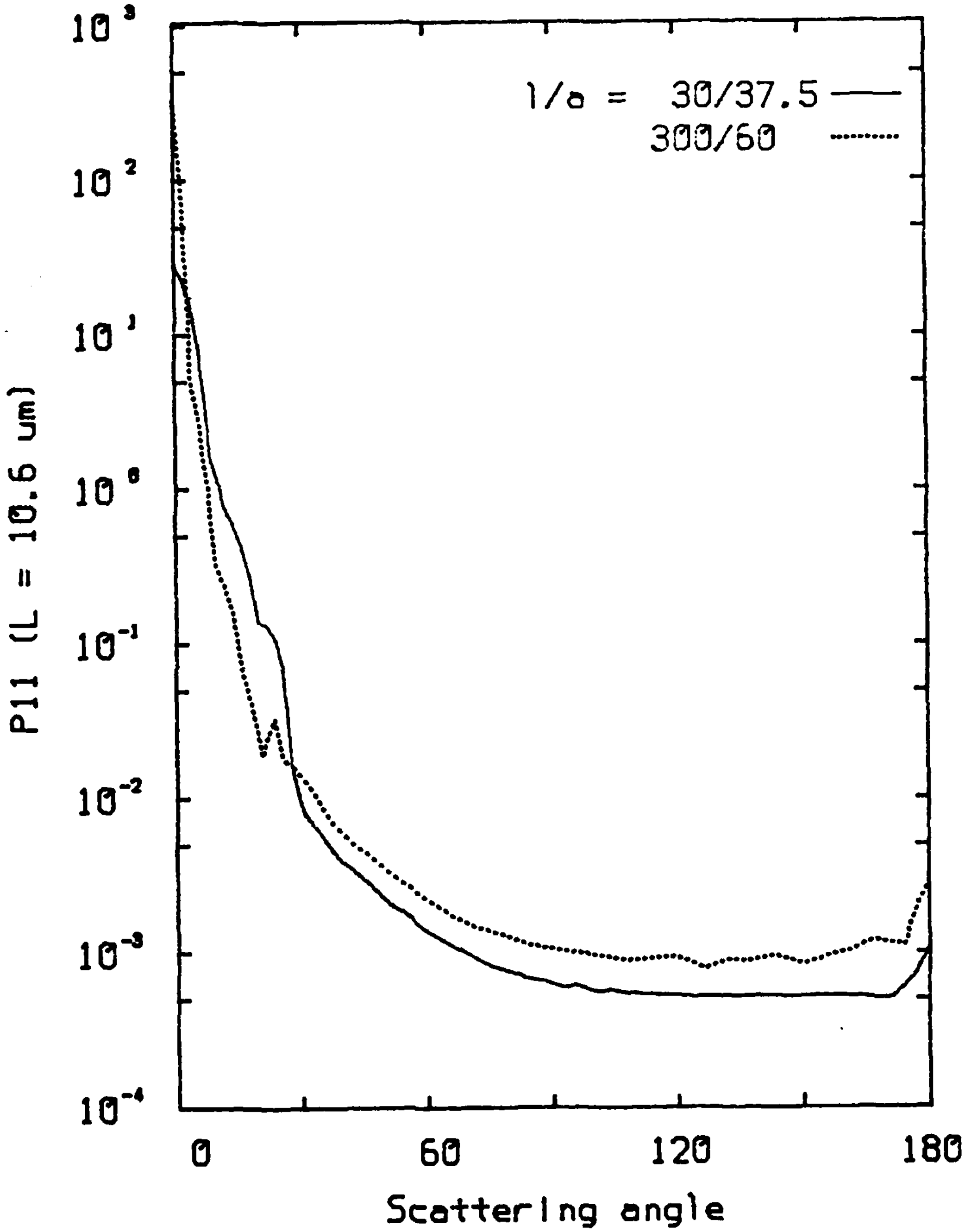
10.6 um, l/a = 300/60
Phase function
10^{3}
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
0
60
120
180
Scattering angle

Fig 7



10.6 um, l/a = 30/37.5
Phase function
Scattering angle
10^{2}
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
0
60
120
180

Fig. 8



10^3
10^2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
P11 (L = 10.6 um)
l/a = 30/37.5
300/60
0
60
120
180
Scattering angle

Fig. 9

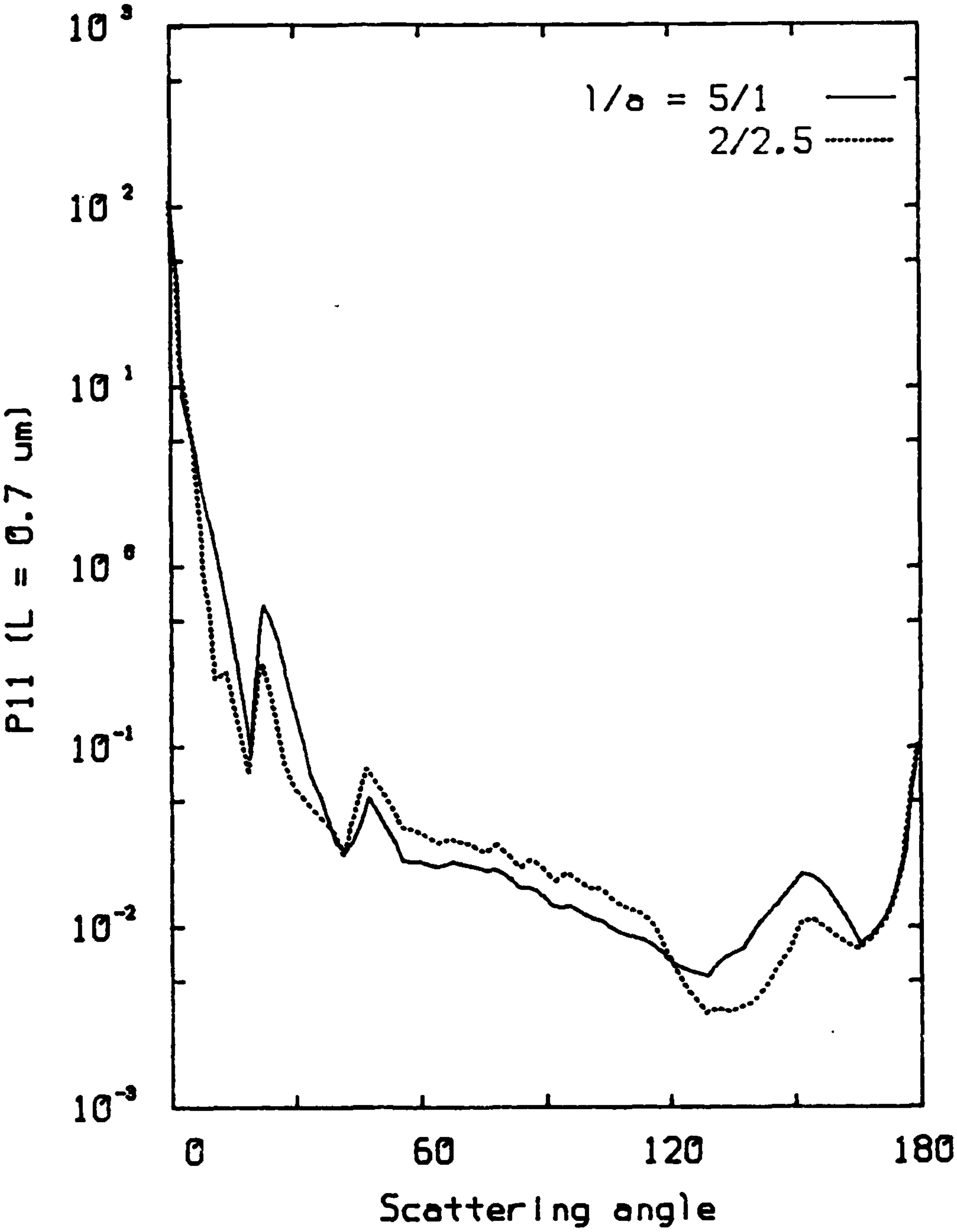


Fig. 10

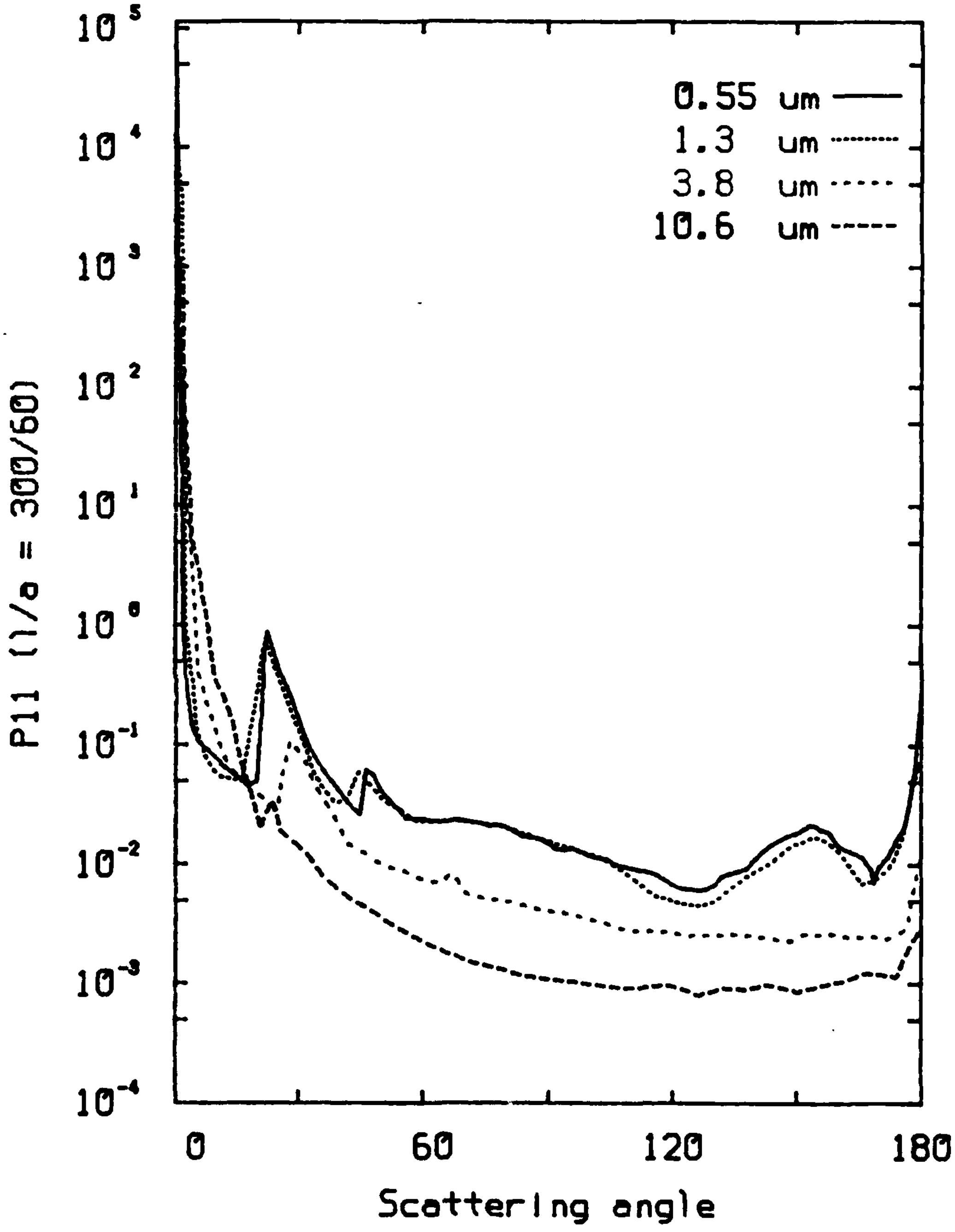


Fig. 11

Table Captions

Table 1. Real and imaginary parts of the refractive index, scattering and extinction cross sections and single-scattering albedo for various wavelengths and crystal dimensions.

Tables 2-9. Six scattering phase matrix elements P_{11}, P_{12}, P_{22}, P_{33}, P_{43} and P_{44} for randomly oriented hexagonal ice crystals as functions of the scattering angle in two degree intervals. These elements are defined by

$$\vec{P}(\Theta) = \begin{bmatrix} P_{11} & P_{12} & 0 & 0 \\ P_{12} & P_{22} & 0 & 0 \\ 0 & 0 & P_{33} & -P_{43} \\ 0 & 0 & P_{43} & P_{44} \end{bmatrix}$$

where P_{11} denotes the normalized scattering phase function displayed in the figures. $-P_{12}/P_{11}$ represents the dgree of linear polarization for incident unpolarized light. Also, P_{22}/P_{11} denotes a measure of depolarization when the incident light is linearly polarized. Elements P_{33}, P_{43} and P_{44} are associated with the Stokes vectors U and V. Laser wavelength and crystal dimension along with pertinent optical parameters are listed in each Table.

Table 2. $\lambda = 0.55$ µm, $\ell/a = 300/60$ µm.

Table 3. $\lambda = 0.6328$ µm, $\ell/a = 8/10$ µm

Table 4. $\lambda = 0.7$ µm, $\ell/a = 5/1$ µm

Table 5. $\lambda = 0.7$ µm, $\ell/a = 2/2.5$ µm

Table 6. λ = 1.3 μm, ℓ/a = 300/60 μm

Table 7. λ = 3.8 μm, ℓ/a = 300/60 μm

Table 8. λ = 10.6 μm, ℓ/a = 300/60 μm

Table 9. λ = 10.6 μm, ℓ/a = 30/37.5 μm

Table 1. Real and imaginary parts of the refractive index, scattering and extinction cross sections and single-scattering albedo for various wavelengths and crystal dimensions.

L/a (μm)	λ (μm)	m_r	m_i	σ_s (10^{-4} cm^2)	σ_e (10^{-4} cm^2)	$\tilde{\omega}_0$
300/60	0.55	1.310	0.000	5.653	5.653	1.000
	0.7	1.310	0.000	5.653	5.653	1.000
	1.3	1.296	1.2×10^{-5}	5.508	5.623	0.979
	3.8	1.383	0.007	3.205	5.623	0.570
	10.6	1.097	0.134	2.999	5.653	0.531
	10.8	1.038	0.169	2.997	5.653	0.530
	11.9	1.259	0.409	3.110	5.653	0.550
5/1	0.7	1.310	0.000	0.002	0.002	1.000
2/2.5	0.7	1.310	0.000	0.003	0.003	1.000
30/37.5	10.6	1.097	0.134	0.413	0.735	0.561
8/10	0.6328	1.310	0.000			1.000

Table 2

Real refractive index = 1.311
Imaginary refractive index = 3.110E-9

Scattering cross section = 5.653E-4 cm*cm
Extinction cross section = 5.653E-4 cm*cm
Single scattering albedo = 1.000

Wavelength = 0.55 um
1/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
0	.62403E+05	.00000E+00	.62041E+05	.62041E+05	.00000E+00	.61685E+05
2	.11572E+01	-.48354E-02	.10830E+01	.10227E+01	.17704E-01	.94861E+00
4	.14220E+00	-.33756E-02	.11079E+00	.50960E-01	.77794E-02	.19558E-01
6	.98825E-01	-.54130E-02	.79071E-01	-.29413E-01	.47048E-02	-.49160E-01
8	.86690E-01	-.56744E-02	.71729E-01	-.35476E-01	.30685E-02	-.50429E-01
10	.74555E-01	-.59358E-02	.64388E-01	-.41540E-01	.14322E-02	-.51698E-01
12	.62420E-01	-.61972E-02	.57047E-01	-.47603E-01	-.20409E-03	-.52968E-01
14	.54875E-01	-.64410E-02	.51736E-01	-.47601E-01	-.10802E-02	-.50731E-01
16	.49572E-01	-.66763E-02	.47416E-01	-.44637E-01	-.15852E-02	-.46783E-01
18	.44269E-01	-.69115E-02	.43096E-01	-.41673E-01	-.20901E-02	-.42835E-01
20	.47542E-01	-.93703E-02	.45876E-01	-.44090E-01	-.19076E-02	-.45731E-01
22	.55289E+00	.13625E-01	.55178E+00	-.55012E+00	-.11623E-02	-.55120E+00
24	.58057E+00	.15898E-01	.57970E+00	-.57758E+00	-.28056E-02	-.57839E+00
26	.35439E+00	.12639E-01	.35361E+00	-.35237E+00	-.80964E-03	-.35303E+00
28	.23944E+00	.65623E-02	.23858E+00	-.23678E+00	-.25324E-02	-.23745E+00
30	.15936E+00	.25696E-02	.15845E+00	-.15638E+00	-.32977E-02	-.15704E+00
32	.10005E+00	.24808E-02	.99174E-01	-.97906E-01	-.13174E-02	-.98507E-01
34	.74991E-01	.92594E-03	.74121E-01	-.72691E-01	-.19691E-02	-.73222E-01
36	.58148E-01	-.24082E-02	.57319E-01	-.54970E-01	-.46459E-02	-.55570E-01
38	.47501E-01	-.37616E-02	.46686E-01	-.43958E-01	-.56119E-02	-.44602E-01
40	.39278E-01	-.43400E-02	.38468E-01	-.35572E-01	-.59085E-02	-.36251E-01
42	.31056E-01	-.49184E-02	.30249E-01	-.27186E-01	-.62051E-02	-.27899E-01
44	.26892E-01	-.45845E-02	.25601E-01	-.22890E-01	-.44705E-02	-.23907E-01
46	.49653E-01	.11260E-02	.47676E-01	-.45071E-01	-.26489E-02	-.46644E-01
48	.54662E-01	-.26769E-03	.52328E-01	-.48326E-01	-.69905E-02	-.50347E-01
50	.39103E-01	.16610E-02	.36476E-01	-.34468E-01	-.19820E-02	-.36400E-01
52	.33280E-01	.37809E-03	.30280E-01	-.27988E-01	-.20791E-02	-.30425E-01
54	.28139E-01	-.61828E-03	.25330E-01	-.22824E-01	-.32069E-02	-.25185E-01
56	.22998E-01	-.16147E-02	.20380E-01	-.17660E-01	-.43346E-02	-.19946E-01
58	.23018E-01	-.19473E-02	.19712E-01	-.16974E-01	-.44289E-02	-.19786E-01
60	.23063E-01	-.20393E-02	.19126E-01	-.16398E-01	-.42528E-02	-.19733E-01
62	.22300E-01	-.19661E-02	.17939E-01	-.15221E-01	-.39378E-02	-.18976E-01
64	.21537E-01	-.18928E-02	.16753E-01	-.14045E-01	-.36227E-02	-.18220E-01
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68	.22832E-01	-.19166E-02	.16752E-01	-.13841E-01	-.36152E-02	-.19124E-01
70	.22323E-01	-.17536E-02	.15894E-01	-.13104E-01	-.34878E-02	-.18663E-01
72	.21815E-01	-.15905E-02	.15036E-01	-.12367E-01	-.33605E-02	-.18201E-01
74	.21191E-01	-.15232E-02	.14164E-01	-.11536E-01	-.31783E-02	-.17590E-01
76	.20450E-01	-.15769E-02	.13307E-01	-.10613E-01	-.29435E-02	-.16812E-01
78	.20739E-01	-.15652E-02	.13418E-01	-.10591E-01	-.32650E-02	-.16921E-01
80	.19815E-01	-.15333E-02	.12572E-01	-.97250E-02	-.31781E-02	-.16023E-01
82	.18163E-01	-.14893E-02	.11151E-01	-.83538E-02	-.28463E-02	-.14520E-01
84	.16512E-01	-.14453E-02	.97301E-02	-.69826E-02	-.25144E-02	-.13018E-01
86	.16387E-01	-.14554E-02	.96852E-02	-.67648E-02	-.27451E-02	-.12712E-01
88	.15941E-01	-.14531E-02	.94787E-02	-.64474E-02	-.28886E-02	-.12168E-01
90	.14507E-01	-.14144E-02	.85719E-02	-.55954E-02	-.27147E-02	-.10871E-01

Wavelength = 0.55 um
1/a = 300/6.0 um

Oth	F11	F12	F22	F33	F43	F44
92	.13073E-01	-.13757E-02	.76651E-02	-.47433E-02	-.25407E-02	-.95746E-02
94	.12813E-01	-.13976E-02	.76836E-02	-.44996E-02	-.26501E-02	-.90899E-02
96	.13111E-01	-.14325E-02	.81484E-02	-.45741E-02	-.28800E-02	-.90141E-02
98	.12354E-01	-.13441E-02	.78035E-02	-.42244E-02	-.27929E-02	-.83027E-02
100	.11596E-01	-.12557E-02	.74587E-02	-.38747E-02	-.27059E-02	-.75912E-02
102	.11025E-01	-.12354E-02	.71913E-02	-.34733E-02	-.25946E-02	-.69321E-02
104	.10762E-01	-.13283E-02	.70530E-02	-.29859E-02	-.24429E-02	-.63601E-02
106	.98690E-02	-.12770E-02	.64030E-02	-.24647E-02	-.20735E-02	-.56271E-02
108	.92959E-02	-.12281E-02	.60823E-02	-.22466E-02	-.17227E-02	-.51810E-02
110	.89875E-02	-.11848E-02	.60305E-02	-.22652E-02	-.13918E-02	-.49620E-02
112	.86792E-02	-.11415E-02	.59787E-02	-.22838E-02	-.10610E-02	-.47431E-02
114	.83964E-02	-.12412E-02	.57984E-02	-.21532E-02	-.43792E-03	-.44786E-02
116	.79688E-02	-.13500E-02	.54626E-02	-.18235E-02	.89514E-04	-.40368E-02
118	.72486E-02	-.13854E-02	.49114E-02	-.12085E-02	.24841E-03	-.32855E-02
120	.65283E-02	-.14209E-02	.43601E-02	-.59346E-03	.40731E-03	-.25341E-02
122	.61455E-02	-.15142E-02	.40144E-02	-.30267E-04	.48023E-03	-.19477E-02
124	.60603E-02	-.16586E-02	.38499E-02	.48720E-03	.47730E-03	-.15069E-02
126	.59751E-02	-.18030E-02	.36855E-02	.10047E-02	.47437E-03	-.10660E-02
128	.60372E-02	-.13912E-02	.37128E-02	.47935E-03	.60956E-03	-.15588E-02
130	.65131E-02	-.11420E-02	.38676E-02	.25399E-03	.74252E-03	-.20114E-02
132	.77731E-02	-.17293E-02	.41380E-02	.15862E-02	.75171E-03	-.15719E-02
134	.82035E-02	-.17580E-02	.41330E-02	.19430E-02	.83268E-03	-.16008E-02
136	.85481E-02	-.17288E-02	.40996E-02	.21989E-02	.92109E-03	-.16780E-02
138	.90304E-02	-.17359E-02	.40895E-02	.24740E-02	.98920E-03	-.18218E-02
140	.10844E-01	-.20931E-02	.43053E-02	.29344E-02	.86125E-03	-.26085E-02
142	.12658E-01	-.24503E-02	.45211E-02	.33948E-02	.73330E-03	-.33952E-02
144	.14333E-01	-.26408E-02	.44528E-02	.37360E-02	.50192E-03	-.44467E-02
146	.15654E-01	-.24053E-02	.36584E-02	.37727E-02	.61817E-05	-.61752E-02
148	.16976E-01	-.21698E-02	.28640E-02	.38093E-02	-.48955E-03	-.79037E-02
150	.17697E-01	-.19551E-02	.27702E-02	.43514E-02	-.12402E-02	-.81744E-02
152	.19389E-01	-.14611E-02	.39211E-02	.36780E-02	-.24968E-02	-.92500E-02
154	.20512E-01	-.95460E-03	.47004E-02	.30226E-02	-.38655E-02	-.10026E-01
156	.18729E-01	-.78263E-03	.51208E-02	.48605E-02	-.35152E-02	-.61391E-02
158	.17516E-01	-.38760E-03	.32710E-02	.31939E-02	-.31657E-02	-.82091E-02
160	.14137E-01	-.25796E-03	.21324E-02	.47181E-02	-.18639E-02	-.49422E-02
162	.12676E-01	-.15985E-03	.26332E-02	.68498E-02	-.71162E-03	-.11903E-02
164	.11895E-01	.10863E-03	.24392E-02	.74926E-02	-.66814E-03	-.29668E-03
166	.11114E-01	.37711E-03	.22452E-02	.81354E-02	-.62465E-03	.59698E-03
168	.87954E-02	.60380E-03	.11312E-02	.68837E-02	-.60657E-03	.28786E-03
170	.93097E-02	.10889E-02	-.68976E-03	.68842E-02	-.85966E-03	-.18604E-02
172	.11236E-01	.14450E-02	-.12986E-03	.85997E-02	-.92432E-03	-.14809E-02
174	.15114E-01	.22140E-02	.19698E-02	.11624E-01	-.13258E-02	.11751E-03
176	.19641E-01	.35449E-02	-.16348E-02	.14534E-01	-.18822E-02	-.46713E-02
178	.45015E-01	.95172E-02	-.11043E-02	.32163E-01	-.45892E-02	-.90951E-02
180	.25916E+00	.11642E-09	.70935E-01	-.70935E-01	-.11642E-09	-.51497E-01

Case 3

Real refractive index = 1.308
Imaginary refractive index = 1.170E-8

Scattering cross section = 5.653E-4 cm*cm
Extinction cross section = 5.653E-4 cm*cm
Single scattering albedo = 1.000

Wavelength = 0.6328 um
1/a = 8/10 um

CTA	P11	P12	P22	P33	P43	P44
0	.41676E+03	.28283E+01	.41624E+03	.28986E+03	-.18333E+01	.29036E+03
2	.12429E+03	.81669E+00	.12414E+03	.87612E+02	-.52964E+00	.87756E+02
4	.34894E+01	-.20441E-02	.34894E+01	.34155E+01	-.58614E-03	.34155E+01
6	.69653E+00	-.37149E-02	.69653E+00	.56924E+00	-.11847E-02	.56924E+00
8	.28096E+00	-.15303E-02	.28096E+00	.24204E+00	-.31148E-03	.24204E+00
10	.17057E+00	-.36104E-02	-.16215E-02	.10240E+00	-.13071E-02	.10240E+00
12	.18564E+00	-.54377E-02	-.13675E+00	.45474E-01	-.19840E-02	.45462E-01
14	.26743E+00	-.48531E-02	-.88171E-01	.38866E-01	-.12577E-02	.38850E-01
16	.34921E+00	-.42686E-02	-.39593E-01	.32257E-01	-.53140E-03	.32239E-01
18	.43100E+00	-.36840E-02	.89848E-02	.25649E-01	.19492E-03	.25627E-01
20	.47139E+00	-.20301E-02	.71364E-01	-.65317E-02	.60146E-03	-.65598E-02
22	.28832E+00	.53984E-02	.20827E+00	-.17681E+00	-.71885E-03	-.17685E+00
24	.18444E+00	.33770E-02	.18435E+00	-.16513E+00	-.17462E-02	-.16519E+00
26	.12343E+00	-.34278E-03	.12330E+00	-.10901E+00	-.21957E-02	-.10908E+00
28	.93852E-01	-.12916E-02	.93703E-01	-.83834E-01	-.17284E-02	-.83893E-01
30	.64270E-01	-.22404E-02	.64103E-01	-.58655E-01	-.12612E-02	-.58709E-01
32	.47676E-01	-.28186E-02	.47476E-01	-.44264E-01	-.16208E-02	-.44304E-01
34	.42541E-01	-.30697E-02	.42296E-01	-.39392E-01	-.27100E-02	-.39412E-01
36	.37406E-01	-.33208E-02	.37116E-01	-.34521E-01	-.37992E-02	-.34519E-01
38	.34586E-01	-.34158E-02	.34256E-01	-.31825E-01	-.46939E-02	-.31798E-01
40	.32671E-01	-.34498E-02	.32305E-01	-.29980E-01	-.55125E-02	-.29926E-01
42	.30756E-01	-.34837E-02	.30353E-01	-.28134E-01	-.63312E-02	-.28054E-01
44	.29094E-01	-.55823E-03	.28680E-01	-.27334E-01	-.40396E-02	-.27241E-01
46	.39898E-01	.15998E-02	.39423E-01	-.37795E-01	-.44374E-02	-.37710E-01
48	.60147E-01	.24735E-02	.59568E-01	-.56561E-01	-.75600E-02	-.56505E-01
50	.51458E-01	.13098E-02	.50840E-01	-.47791E-01	-.79162E-02	-.47769E-01
52	.42769E-01	.14608E-03	.42111E-01	-.39021E-01	-.82725E-02	-.39032E-01
54	.35602E-01	-.80042E-03	.34909E-01	-.31775E-01	-.85686E-02	-.31823E-01
56	.32322E-01	-.11918E-02	.31606E-01	-.28419E-01	-.87107E-02	-.28515E-01
58	.29042E-01	-.15832E-02	.28303E-01	-.25064E-01	-.88528E-02	-.25206E-01
60	.26941E-01	-.17771E-02	.26149E-01	-.22819E-01	-.89901E-02	-.23053E-01
62	.26177E-01	-.17472E-02	.25295E-01	-.21833E-01	-.91219E-02	-.22210E-01
64	.25413E-01	-.17172E-02	.24442E-01	-.20847E-01	-.92537E-02	-.21366E-01
66	.25260E-01	-.16472E-02	.24127E-01	-.20506E-01	-.93597E-02	-.21139E-01
68	.25427E-01	-.15562E-02	.24094E-01	-.20502E-01	-.94523E-02	-.21236E-01
70	.25594E-01	-.14652E-02	.24061E-01	-.20499E-01	-.95450E-02	-.21332E-01
72	.25761E-01	-.13741E-02	.24028E-01	-.20496E-01	-.96376E-02	-.21429E-01
74	.25576E-01	-.12949E-02	.23700E-01	-.20139E-01	-.96542E-02	-.21177E-01
76	.24940E-01	-.12307E-02	.22995E-01	-.19327E-01	-.95732E-02	-.20479E-01
78	.24303E-01	-.11665E-02	.22289E-01	-.18515E-01	-.94921E-02	-.19781E-01
80	.23027E-01	-.10373E-02	.21058E-01	-.17296E-01	-.91285E-02	-.18566E-01
82	.21366E-01	-.86901E-03	.19510E-01	-.15832E-01	-.85955E-02	-.17040E-01
84	.19706E-01	-.70073E-03	.17963E-01	-.14369E-01	-.80624E-02	-.15514E-01
86	.18675E-01	-.61894E-03	.16931E-01	-.13357E-01	-.76626E-02	-.14561E-01
88	.17789E-01	-.55711E-03	.16018E-01	-.12450E-01	-.72935E-02	-.13741E-01
90	.16904E-01	-.49528E-03	.15106E-01	-.11543E-01	-.69245E-02	-.12921E-01

Wavelength = 0.6328 um
1/a = 8/10 um

ETA	P11	P12	P22	P33	P43	P44
92	.15521E-01	-.51912E-03	.13648E-01	-.10178E-01	-.62115E-02	-.11702E-01
94	.14139E-01	-.54297E-03	.12190E-01	-.88118E-02	-.54986E-02	-.10482E-01
96	.12984E-01	-.55525E-03	.10943E-01	-.76478E-02	-.48793E-02	-.94606E-02
98	.12813E-01	-.51743E-03	.10611E-01	-.73586E-02	-.46660E-02	-.93003E-02
100	.12643E-01	-.47961E-03	.10278E-01	-.70694E-02	-.44526E-02	-.91399E-02
102	.12482E-01	-.43164E-03	.99416E-02	-.67824E-02	-.42132E-02	-.90038E-02
104	.12336E-01	-.36678E-03	.95991E-02	-.64992E-02	-.39302E-02	-.89083E-02
106	.12190E-01	-.30192E-03	.92567E-02	-.62160E-02	-.36472E-02	-.88128E-02
108	.11772E-01	-.17135E-03	.86590E-02	-.59686E-02	-.32707E-02	-.87346E-02
110	.11141E-01	.10333E-04	.78626E-02	-.57490E-02	-.28212E-02	-.86697E-02
112	.10511E-01	.19201E-03	.70663E-02	-.55294E-02	-.23718E-02	-.86048E-02
114	.88147E-02	-.12640E-03	.54659E-02	-.35780E-02	-.14473E-02	-.65936E-02
116	.72588E-02	-.52369E-03	.40540E-02	-.17216E-02	-.72447E-03	-.45685E-02
118	.66485E-02	-.75330E-03	.35137E-02	-.11487E-02	-.68912E-03	-.37556E-02
120	.60382E-02	-.98292E-03	.29735E-02	-.57590E-03	-.65378E-03	-.29472E-02
122	.53318E-02	-.10730E-02	.25168E-02	-.85195E-04	-.53877E-03	-.21414E-02
124	.45406E-02	-.10400E-02	.21337E-02	.33302E-03	-.35349E-03	-.13503E-02
126	.37494E-02	-.10070E-02	.17506E-02	.75124E-03	-.16821E-03	-.55916E-03
128	.33541E-02	-.92634E-03	.15948E-02	.98795E-03	-.97538E-04	-.14798E-03
130	.31138E-02	-.82701E-03	.15278E-02	.11536E-02	-.71717E-04	.11453E-03
132	.28734E-02	-.72769E-03	.14608E-02	.13193E-02	-.45897E-04	.37704E-03
134	.28736E-02	-.70983E-03	.14826E-02	.14317E-02	-.40255E-04	.46038E-03
136	.28986E-02	-.70041E-03	.15135E-02	.15386E-02	-.36702E-04	.52517E-03
138	.29549E-02	-.70403E-03	.15590E-02	.16424E-02	-.36742E-04	.57570E-03
140	.33127E-02	-.83377E-03	.17453E-02	.17169E-02	-.71522E-04	.48831E-03
142	.36704E-02	-.96351E-03	.19315E-02	.17914E-02	-.10630E-03	.40091E-03
144	.41607E-02	-.10860E-02	.21767E-02	.17915E-02	-.17855E-03	.17374E-03
146	.49897E-02	-.11900E-02	.25724E-02	.16014E-02	-.34655E-03	-.41064E-03
148	.58186E-02	-.12941E-02	.29681E-02	.14114E-02	-.51454E-03	-.99503E-03
150	.68668E-02	-.11600E-02	.31146E-02	.95993E-03	-.94325E-03	-.22830E-02
152	.81869E-02	-.76630E-03	.31149E-02	.24890E-03	-.16951E-02	-.42229E-02
154	.98590E-02	-.52504E-03	.51562E-02	.86657E-04	-.28624E-02	-.39823E-02
156	.94622E-02	-.15202E-03	.48580E-02	.45417E-03	-.30389E-02	-.35012E-02
158	.81006E-02	.21648E-03	.35312E-02	.10849E-02	-.26319E-02	-.28305E-02
160	.70962E-02	.36434E-03	.27953E-02	.16729E-02	-.20308E-02	-.19695E-02
162	.59806E-02	.56548E-03	.24500E-02	.27652E-02	-.10072E-02	-.19870E-03
164	.53963E-02	.78248E-03	.20121E-02	.34934E-02	-.42351E-03	.61195E-03
166	.55334E-02	.10047E-02	.14228E-02	.36450E-02	-.50656E-03	.31111E-04
168	.60290E-02	.11486E-02	.27180E-02	.41577E-02	-.60606E-03	.12972E-02
170	.67603E-02	.16711E-02	.31838E-02	.44740E-02	-.75015E-03	.13619E-02
172	.81370E-02	.24053E-02	.35410E-02	.51807E-02	-.95016E-03	.10985E-02
174	.11314E-01	.30845E-02	.52874E-02	.77029E-02	-.12543E-02	.22375E-02
176	.16898E-01	.53677E-02	.72487E-02	.10897E-01	-.22579E-02	.20974E-02
178	.31060E-01	-.64143E-03	.20562E-01	.14304E-01	-.13457E-02	.52977E-02
180	.56948E-01	-.19311E-01	.50393E-01	.17796E-01	.26024E-02	.13811E-01

Table 4

Real refractive index = 1.307
Imaginary refractive index = 2.900E-0[illegible]

Scattering cross section = 2.0E-7 cm*cm
Extinction cross section = 2.0E-7 cm*cm
Single scattering albedo = 1.000

Wavelength = 0.7 um
l/a = 5/1 um

CTA	P11	P12	P22	P33	P43	P44
0	.10184E+03	.00000E+00	.11507E+02	.11507E+02	.00000E+00	-.77446E+02
2	.35553E+02	-.29813E-02	.94278E+01	.93630E+01	.77747E-02	-.16363E+02
4	.69468E+01	-.40803E-02	.69136E+01	.68339E+01	.86586E-02	.68007E+01
6	.43138E+01	-.39644E-02	.42915E+01	.42274E+01	.52157E-02	.42051E+01
8	.25063E+01	-.41644E-02	.24926E+01	.24279E+01	.34547E-02	.24142E+01
10	.15515E+01	-.45804E-02	.15425E+01	.14722E+01	.17134E-02	.14632E+01
12	.94894E+00	-.46641E-02	.94312E+00	.87627E+00	.59441E-03	.87046E+00
14	.53530E+00	-.40930E-02	.53210E+00	.48597E+00	.50336E-03	.48278E+00
16	.29690E+00	-.45874E-02	.29490E+00	.24260E+00	-.27806E-03	.24061E+00
18	.15378E+00	-.49620E-02	.15255E+00	.98424E-01	-.85210E-03	.97207E-01
20	.14979E+00	-.26052E-02	.14898E+00	-.26393E-01	-.11441E-02	-.27184E-01
22	.52067E+00	.13854E-01	.52000E+00	-.44339E+00	-.87759E-03	-.44404E+00
24	.52061E+00	.15474E-01	.51989E+00	-.46136E+00	-.11191E-02	-.46202E+00
26	.38681E+00	.11582E-01	.38599E+00	-.34572E+00	-.15614E-02	-.34642E+00
28	.23374E+00	.66101E-02	.23285E+00	-.22894E+00	-.20636E-02	-.22964E+00
30	.15964E+00	.38630E-02	.15876E+00	-.15705E+00	-.25371E-02	-.15769E+00
32	.10548E+00	.19371E-02	.10460E+00	-.10301E+00	-.23407E-02	-.10361E+00
34	.67514E-01	.58313E-03	.66646E-01	-.65260E-01	-.17882E-02	-.65842E-01
36	.52316E-01	-.92327E-03	.51442E-01	-.49733E-01	-.28685E-02	-.50320E-01
38	.38665E-01	-.21201E-02	.37827E-01	-.35974E-01	-.34160E-02	-.36542E-01
40	.28875E-01	-.30078E-02	.27977E-01	-.26045E-01	-.35766E-02	-.26665E-01
42	.26246E-01	-.34819E-02	.25041E-01	-.23019E-01	-.33441E-02	-.23865E-01
44	.29449E-01	-.23286E-02	.28228E-01	-.26025E-01	-.34334E-02	-.26958E-01
46	.38767E-01	-.53599E-03	.37196E-01	-.34684E-01	-.37835E-02	-.35915E-01
48	.51355E-01	.14286E-02	.49109E-01	-.46211E-01	-.43045E-02	-.47947E-01
50	.42283E-01	.50247E-03	.39707E-01	-.36855E-01	-.42811E-02	-.38900E-01
52	.35270E-01	-.26416E-03	.32611E-01	-.29796E-01	-.43231E-02	-.31971E-01
54	.29192E-01	-.95827E-03	.26564E-01	-.23781E-01	-.43949E-02	-.26004E-01
56	.23115E-01	-.16524E-02	.20517E-01	-.17766E-01	-.44666E-02	-.20036E-01
58	.23019E-01	-.19473E-02	.19712E-01	-.16974E-01	-.44288E-02	-.19786E-01
60	.23064E-01	-.20393E-02	.19126E-01	-.16398E-01	-.42528E-02	-.19733E-01
62	.22300E-01	-.19661E-02	.17939E-01	-.15221E-01	-.39378E-02	-.18976E-01
64	.21537E-01	-.18928E-02	.16753E-01	-.14044E-01	-.36227E-02	-.18220E-01
66	.22061E-01	-.19097E-02	.16636E-01	-.13820E-01	-.35763E-02	-.18557E-01
68	.22832E-01	-.19169E-02	.16753E-01	-.13841E-01	-.36152E-02	-.19123E-01
70	.22323E-01	-.17536E-02	.15894E-01	-.13104E-01	-.34878E-02	-.18663E-01
72	.21815E-01	-.15906E-02	.15036E-01	-.12367E-01	-.33605E-02	-.18202E-01
74	.21190E-01	-.15232E-02	.14164E-01	-.11536E-01	-.31783E-02	-.17590E-01
76	.20450E-01	-.15770E-02	.13307E-01	-.10614E-01	-.29436E-02	-.16812E-01
78	.20739E-01	-.15652E-02	.13418E-01	-.10591E-01	-.32650E-02	-.16921E-01
80	.19815E-01	-.15333E-02	.12572E-01	-.97253E-02	-.31781E-02	-.16023E-01
82	.18163E-01	-.14893E-02	.11151E-01	-.83539E-02	-.28463E-02	-.14521E-01
84	.16512E-01	-.14453E-02	.97301E-02	-.69826E-02	-.25144E-02	-.13018E-01
86	.16387E-01	-.14554E-02	.96852E-02	-.67648E-02	-.27452E-02	-.12712E-01
88	.15940E-01	-.14531E-02	.94787E-02	-.64474E-02	-.28886E-02	-.12168E-01
90	.14507E-01	-.14144E-02	.85719E-02	-.55953E-02	-.27147E-02	-.10871E-01

Wavelength = 0.7 um
1/a = 571 um

ETA	P11	P12	P22	P33	P43	P44
92	.13073E-01	-.13757E-02	.76651E-02	-.47433E-02	-.25408E-02	-.95746E-02
94	.12813E-01	-.13976E-02	.76838E-02	-.44996E-02	-.26501E-02	-.90899E-02
96	.13111E-01	-.14325E-02	.81485E-02	-.45741E-02	-.28800E-02	-.90141E-02
98	.12354E-01	-.13441E-02	.78036E-02	-.42244E-02	-.27929E-02	-.83027E-02
100	.11596E-01	-.12557E-02	.74587E-02	-.38747E-02	-.27059E-02	-.75912E-02
102	.11025E-01	-.12354E-02	.71913E-02	-.34733E-02	-.25946E-02	-.69321E-02
104	.10762E-01	-.13283E-02	.70530E-02	-.29860E-02	-.24429E-02	-.63600E-02
106	.98689E-02	-.12770E-02	.64030E-02	-.24648E-02	-.20735E-02	-.56270E-02
108	.92958E-02	-.12281E-02	.60823E-02	-.22467E-02	-.17227E-02	-.51809E-02
110	.89875E-02	-.11848E-02	.60305E-02	-.22652E-02	-.13918E-02	-.49620E-02
112	.86791E-02	-.11415E-02	.59787E-02	-.22838E-02	-.10610E-02	-.47431E-02
114	.83964E-02	-.12412E-02	.57985E-02	-.21532E-02	-.43791E-03	-.44786E-02
116	.79689E-02	-.13500E-02	.54626E-02	-.18235E-02	.89514E-04	-.40368E-02
118	.72486E-02	-.13854E-02	.49114E-02	-.12085E-02	.24841E-03	-.32854E-02
120	.65284E-02	-.14209E-02	.43601E-02	-.59346E-03	.40731E-03	-.25341E-02
122	.60536E-02	-.13711E-02	.39368E-02	-.14669E-03	.53527E-03	-.20404E-02
124	.57955E-02	-.12462E-02	.36264E-02	.15162E-03	.63595E-03	-.17741E-02
126	.55374E-02	-.11213E-02	.33160E-02	.44994E-03	.73663E-03	-.15078E-02
128	.53752E-02	-.11874E-02	.29549E-02	.78503E-03	.66436E-03	-.13588E-02
130	.55266E-02	-.13005E-02	.28412E-02	.10449E-02	.61285E-03	-.13205E-02
132	.62855E-02	-.13524E-02	.33151E-02	.11076E-02	.75589E-03	-.14247E-02
134	.67716E-02	-.13562E-02	.32276E-02	.14232E-02	.68896E-03	-.15621E-02
136	.71545E-02	-.13200E-02	.29574E-02	.15125E-02	.68176E-03	-.20216E-02
138	.75815E-02	-.12867E-02	.26388E-02	.14313E-02	.74947E-03	-.27446E-02
140	.91605E-02	-.16193E-02	.30563E-02	.21435E-02	.75400E-03	-.29354E-02
142	.10706E-01	-.19958E-02	.30636E-02	.25657E-02	.51844E-03	-.37898E-02
144	.12137E-01	-.22497E-02	.28547E-02	.27982E-02	.19966E-03	-.49290E-02
146	.13313E-01	-.21392E-02	.25695E-02	.28826E-02	-.52937E-04	-.60254E-02
148	.15290E-01	-.19875E-02	.20298E-02	.36358E-02	-.58148E-03	-.74687E-02
150	.17459E-01	-.17825E-02	.24116E-02	.38049E-02	-.14432E-02	-.88520E-02
152	.19553E-01	-.15081E-02	.38030E-02	.32682E-02	-.26061E-02	-.99573E-02
154	.19236E-01	-.99604E-03	.40563E-02	.36942E-02	-.32914E-02	-.87553E-02
156	.17973E-01	-.65227E-03	.33749E-02	.40610E-02	-.30709E-02	-.76890E-02
158	.16076E-01	-.42430E-03	.24811E-02	.44241E-02	-.24038E-02	-.63757E-02
160	.13762E-01	-.27932E-03	.24186E-02	.48694E-02	-.18197E-02	-.41088E-02
162	.11679E-01	-.48803E-04	.16063E-02	.51829E-02	-.10875E-02	-.29565E-02
164	.97534E-02	.19431E-03	.68996E-03	.54255E-02	-.61384E-03	-.21046E-02
166	.80508E-02	.43409E-03	-.14238E-03	.56277E-02	-.51599E-03	-.13784E-02
168	.86780E-02	.69958E-03	.24541E-03	.64342E-02	-.67110E-03	-.81205E-03
170	.96508E-02	.10378E-02	.26896E-03	.73173E-02	-.79621E-03	-.83016E-03
172	.11254E-01	.14996E-02	.14172E-03	.85226E-02	-.96691E-03	-.12182E-02
174	.14367E-01	.22464E-02	.25647E-03	.10714E-01	-.13647E-02	-.16750E-02
176	.22296E-01	.42184E-02	-.75467E-03	.16171E-01	-.21929E-02	-.43407E-02
178	.48852E-01	.39517E-02	.97054E-02	.33424E-02	-.19510E-02	-.76211E-02
180	.10101E+00	.58208E-10	.37311E-01	-.37311E-01	-.29104E-10	-.11055E-01

Table 5

Real refractive index = 1.307
Imaginary refractive index = 2.900E-8

Scattering cross section = 3.0E-7 cm*cm
Extinction cross section = 3.0E-7 cm*cm
Single scattering albedo = 1.000

Wavelength = 0.7 um
l/a = 2/2.5

CTA	P11	P12	P22	P33	P43	P44
0	.10273E+03	.00000E+00	.16018E+02	.16018E+02	.00000E+00	-.69151E+02
2	.38215E+02	-.18310E-02	.13164E+02	.13078E+02	-.35348E-03	-.11526E+02
4	.90318E+01	-.20097E-02	.90312E+01	.89483E+01	-.30842E-03	.89483E+01
6	.44224E+01	-.15251E-02	.44224E+01	.43853E+01	-.14884E-03	.43853E+01
8	.15456E+01	-.30651E-02	.15456E+01	.14746E+01	-.67464E-03	.14746E+01
10	.53576E+00	-.40059E-02	.53575E+00	.45607E+00	-.12012E-02	.45606E+00
12	.23753E+00	-.37757E-02	.23752E+00	.17169E+00	-.12479E-02	.17169E+00
14	.25401E+00	-.18734E-02	.25400E+00	.22800E+00	-.49464E-03	.22800E+00
16	.16328E+00	-.36822E-02	.16327E+00	.11131E+00	-.14861E-02	.11131E+00
18	.10108E+00	-.46882E-02	.10107E+00	.37365E-01	-.22153E-02	.37355E-01
20	.93443E-01	-.36590E-02	.93426E-01	-.12186E-01	-.24467E-02	-.12202E-01
22	.24601E+00	.44864E-02	.24597E+00	-.13295E+00	-.13277E-02	-.13298E+00
24	.22089E+00	.35140E-02	.22081E+00	-.12799E+00	-.16253E-02	-.12805E+00
26	.14338E+00	.29142E-03	.14326E+00	-.90880E-01	-.16629E-02	-.90937E-01
28	.78923E-01	-.14251E-02	.78766E-01	-.72388E-01	-.30254E-03	-.72417E-01
30	.61516E-01	-.21359E-02	.61299E-01	-.57455E-01	-.28087E-03	-.57446E-01
32	.51876E-01	-.25584E-02	.51601E-01	-.47855E-01	-.92803E-03	-.47812E-01
34	.46321E-01	-.27855E-02	.45992E-01	-.42752E-01	-.20866E-02	-.42679E-01
36	.40765E-01	-.30126E-02	.40383E-01	-.37649E-01	-.32452E-02	-.37547E-01
38	.37106E-01	-.31993E-02	.36700E-01	-.34275E-01	-.47673E-02	-.34148E-01
40	.32758E-01	-.28927E-02	.32330E-01	-.30343E-01	-.55779E-02	-.30180E-01
42	.25263E-01	-.15359E-02	.24788E-01	-.23692E-01	-.45104E-02	-.23467E-01
44	.36374E-01	-.10285E-02	.35974E-01	-.33927E-01	-.59879E-02	-.33852E-01
46	.54557E-01	.10742E-02	.54091E-01	-.51230E-01	-.74509E-02	-.51205E-01
48	.74580E-01	.43688E-02	.73908E-01	-.70595E-01	-.85857E-02	-.70513E-01
50	.62649E-01	.29129E-02	.61888E-01	-.58469E-01	-.92329E-02	-.58457E-01
52	.52891E-01	.16047E-02	.52086E-01	-.48617E-01	-.94054E-02	-.48721E-01
54	.44121E-01	.36366E-03	.43291E-01	-.39798E-01	-.93621E-02	-.40041E-01
56	.35350E-01	-.87737E-03	.34496E-01	-.30978E-01	-.93187E-02	-.31360E-01
58	.34416E-01	-.14938E-02	.33324E-01	-.29739E-01	-.10480E-01	-.30107E-01
60	.33598E-01	-.17771E-02	.32328E-01	-.28673E-01	-.11067E-01	-.29106E-01
62	.31642E-01	-.17841E-02	.30299E-01	-.26576E-01	-.10807E-01	-.27188E-01
64	.29687E-01	-.17910E-02	.28270E-01	-.24480E-01	-.10546E-01	-.25269E-01
66	.29733E-01	-.17474E-02	.28074E-01	-.24094E-01	-.10876E-01	-.25120E-01
68	.30327E-01	-.16690E-02	.28389E-01	-.24232E-01	-.11292E-01	-.25488E-01
70	.29417E-01	-.15655E-02	.27353E-01	-.23256E-01	-.11038E-01	-.24627E-01
72	.28507E-01	-.14619E-02	.26318E-01	-.22280E-01	-.10785E-01	-.23766E-01
74	.27223E-01	-.14049E-02	.24903E-01	-.20871E-01	-.10395E-01	-.22537E-01
76	.25582E-01	-.14009E-02	.23119E-01	-.19018E-01	-.98813E-02	-.20942E-01
78	.27783E-01	-.11842E-02	.24991E-01	-.20636E-01	-.10992E-01	-.22662E-01
80	.26924E-01	-.10297E-02	.24133E-01	-.19779E-01	-.10793E-01	-.21797E-01
82	.24230E-01	-.91254E-03	.21638E-01	-.17436E-01	-.98064E-02	-.19380E-01
84	.21535E-01	-.79539E-03	.19143E-01	-.15093E-01	-.88210E-02	-.16963E-01
86	.22611E-01	-.77229E-03	.20138E-01	-.15929E-01	-.92265E-02	-.17778E-01
88	.22904E-01	-.73913E-03	.20354E-01	-.16092E-01	-.92811E-02	-.17960E-01
90	.20784E-01	-.65958E-03	.18254E-01	-.14201E-01	-.83518E-02	-.16129E-01

Wavelength = 0.7 um
l/a = 2/2.5

ETA	P11	P12	P22	P33	P43	P44
92	.18663E-01	-.58003E-03	.16154E-01	-.12309E-01	-.74225E-02	-.14299E-01
94	.18654E-01	-.48237E-03	.15982E-01	-.12093E-01	-.73267E-02	-.14216E-01
96	.19585E-01	-.38412E-03	.16660E-01	-.12633E-01	-.75833E-02	-.14924E-01
98	.18329E-01	-.33705E-03	.15313E-01	-.11478E-01	-.68956E-02	-.13871E-01
100	.17072E-01	-.28998E-03	.13965E-01	-.10323E-01	-.62078E-02	-.12819E-01
102	.16312E-01	-.26214E-03	.13042E-01	-.94732E-02	-.56696E-02	-.12160E-01
104	.16377E-01	-.26634E-03	.12827E-01	-.91310E-02	-.53808E-02	-.12156E-01
106	.14518E-01	-.22685E-03	.10944E-01	-.75122E-02	-.43414E-02	-.10640E-01
108	.13346E-01	-.19770E-03	.96260E-02	-.63997E-02	-.35485E-02	-.97030E-02
110	.12757E-01	-.17769E-03	.87887E-02	-.57131E-02	-.29660E-02	-.92552E-02
112	.12168E-01	-.15768E-03	.79513E-02	-.50265E-02	-.23836E-02	-.88075E-02
114	.11680E-01	-.22457E-03	.75185E-02	-.47022E-02	-.16489E-02	-.83803E-02
116	.10747E-01	-.38734E-03	.68284E-02	-.40699E-02	-.10475E-02	-.74506E-02
118	.89016E-02	-.67783E-03	.53899E-02	-.26191E-02	-.79758E-03	-.55485E-02
120	.70558E-02	-.96833E-03	.39513E-02	-.11683E-02	-.54767E-03	-.36463E-02
122	.56555E-02	-.11139E-02	.28336E-02	-.61845E-04	-.32950E-03	-.21793E-02
124	.46950E-02	-.10853E-02	.20501E-02	.56917E-03	-.16765E-03	-.12764E-02
126	.40602E-02	-.73204E-03	.16255E-02	-.12260E-05	-.20391E-03	-.16355E-02
128	.35832E-02	-.67373E-03	.14816E-02	.58143E-03	-.14968E-03	-.81004E-03
130	.33395E-02	-.71949E-03	.15155E-02	.13119E-02	-.86280E-04	.11447E-03
132	.34732E-02	-.74029E-03	.16987E-02	.13748E-02	-.80621E-04	.23715E-03
134	.34126E-02	-.66606E-03	.15863E-02	.16064E-02	-.72262E-04	.36864E-03
136	.34448E-02	-.62557E-03	.15384E-02	.18021E-02	-.75366E-04	.44676E-03
138	.35899E-02	-.62865E-03	.15857E-02	.19445E-02	-.90213E-04	.47059E-03
140	.37350E-02	-.63174E-03	.16329E-02	.20869E-02	-.10506E-03	.49442E-03
142	.41967E-02	-.76098E-03	.18039E-02	.21798E-02	-.13942E-03	.30630E-03
144	.48864E-02	-.90507E-03	.20390E-02	.22128E-02	-.20982E-03	-.82464E-04
146	.57911E-02	-.94057E-03	.22943E-02	.21497E-02	-.34967E-03	-.73777E-03
148	.66957E-02	-.97607E-03	.25497E-02	.20866E-02	-.48952E-03	-.13931E-02
150	.83175E-02	-.92987E-03	.33822E-02	.15915E-02	-.10468E-02	-.26090E-02
152	.10621E-01	-.77162E-03	.47934E-02	.68675E-03	-.20598E-02	-.43257E-02
154	.10961E-01	-.32151E-03	.50723E-02	.98245E-03	-.28124E-02	-.40248E-02
156	.10562E-01	.25970E-04	.48433E-02	.15481E-02	-.28249E-02	-.32704E-02
158	.97766E-02	.31968E-03	.43482E-02	.22552E-02	-.24497E-02	-.22783E-02
160	.89908E-02	.61340E-03	.38531E-02	.29623E-02	-.20745E-02	-.12862E-02
162	.83097E-02	.10000E-02	.30224E-02	.36369E-02	-.13472E-02	-.77795E-03
164	.78169E-02	.13973E-02	.23127E-02	.41470E-02	-.37075E-03	-.50602E-03
166	.75734E-02	.17844E-02	.18936E-02	.44659E-02	.76395E-03	-.38834E-03
168	.83221E-02	.21230E-02	.31876E-02	.51746E-02	-.53151E-03	.79634E-03
170	.92998E-02	.26851E-02	.39431E-02	.58209E-02	-.11034E-02	.11707E-02
172	.10783E-01	.35048E-02	.47295E-02	.65880E-02	-.13559E-02	.12444E-02
174	.13581E-01	.47661E-02	.67803E-02	.79204E-02	-.20186E-02	.19804E-02
176	.21092E-01	.79489E-02	.10068E-01	.12382E-01	-.31346E-02	.25025E-02
178	.49930E-01	.71836E-02	.18845E-01	.81696E-03	-.27444E-02	.74184E-02
180	.10835E+00	.11642E-09	.35225E-01	-.35225E-01	-.58208E-10	.18828E-01

Table 6

Real refractive index = 1.296
Imaginary refractive index = 1.320E-5

Scattering cross section = 5.508E-4 cm*cm
Extinction cross section = 5.623E-4 cm*cm
Single scattering albedo = 0.979

Wavelength = 1.3 um
1/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
0	.11279E+05	.00000E+00	.11191E+05	.11191E+05	.00000E+00	.11103E+05
2	.35290E+04	-.27206E-02	.32336E+04	.32335E+04	.71573E-02	.32081E+04
4	.57181E+00	-.37206E-02	.54083E+00	.46007E+00	.77508E-02	.42909E+00
6	.11448E+00	-.36356E-02	.94763E-01	.29971E-01	.43208E-02	.10258E-01
8	.73900E-01	-.39503E-02	.61073E-01	-.36800E-02	.29175E-02	-.16503E-01
10	.57689E-01	-.43693E-02	.49497E-01	-.20662E-01	.13402E-02	-.28849E-01
12	.51192E-01	-.49662E-02	.46006E-01	-.29582E-01	.13299E-03	-.34762E-01
14	.49513E-01	-.58110E-02	.45666E-01	-.32843E-01	-.37642E-03	-.36682E-01
16	.47835E-01	-.66558E-02	.45326E-01	-.36103E-01	-.88583E-03	-.38602E-01
18	.96716E-01	-.42932E-02	.95346E-01	-.89390E-01	-.11483E-02	-.90753E-01
20	.22844E+00	.21499E-02	.22788E+00	-.22451E+00	-.11646E-02	-.22506E+00
22	.59517E+00	.17156E-01	.59450E+00	-.59141E+00	-.88868E-03	-.59204E+00
24	.50033E+00	.14874E-01	.49961E+00	-.49679E+00	-.11228E-02	-.49741E+00
26	.30049E+00	.83558E-02	.29973E+00	-.29737E+00	-.15574E-02	-.29796E+00
28	.19392E+00	.47534E-02	.19310E+00	-.19155E+00	-.20497E-02	-.19214E+00
30	.13423E+00	.23732E-02	.13345E+00	-.13187E+00	-.26569E-02	-.13239E+00
32	.88672E-01	.87490E-03	.87941E-01	-.86448E-01	-.24649E-02	-.86923E-01
34	.55678E-01	-.30733E-04	.54978E-01	-.53677E-01	-.18059E-02	-.54127E-01
36	.42581E-01	-.17311E-02	.41878E-01	-.40306E-01	-.28613E-02	-.40751E-01
38	.34912E-01	-.29247E-02	.34163E-01	-.32283E-01	-.37690E-02	-.32767E-01
40	.31683E-01	-.29297E-02	.30876E-01	-.28882E-01	-.39399E-02	-.29417E-01
42	.33550E-01	-.75586E-03	.32695E-01	-.31044E-01	-.26166E-02	-.31619E-01
44	.49121E-01	.12040E-02	.47664E-01	-.45440E-01	-.32565E-02	-.46541E-01
46	.52679E-01	.16092E-02	.50799E-01	-.48216E-01	-.38508E-02	-.49700E-01
48	.43029E-01	.49833E-03	.40952E-01	-.38329E-01	-.41729E-02	-.40005E-01
50	.35552E-01	-.45191E-03	.33148E-01	-.30580E-01	-.42681E-02	-.32501E-01
52	.31388E-01	-.96593E-03	.28724E-01	-.26175E-01	-.42566E-02	-.28332E-01
54	.28729E-01	-.12817E-02	.25837E-01	-.23291E-01	-.41965E-02	-.25679E-01
56	.26070E-01	-.15974E-02	.22950E-01	-.20407E-01	-.41363E-02	-.23026E-01
58	.23412E-01	-.19132E-02	.20063E-01	-.17522E-01	-.40762E-02	-.20373E-01
60	.21994E-01	-.20329E-02	.18296E-01	-.15759E-01	-.39840E-02	-.18937E-01
62	.21984E-01	-.19306E-02	.17798E-01	-.15265E-01	-.38553E-02	-.18878E-01
64	.21974E-01	-.18283E-02	.17300E-01	-.14772E-01	-.37266E-02	-.18820E-01
66	.22145E-01	-.18318E-02	.16851E-01	-.14238E-01	-.35323E-02	-.18864E-01
68	.22289E-01	-.18397E-02	.16410E-01	-.13723E-01	-.33719E-02	-.18882E-01
70	.22063E-01	-.16942E-02	.15915E-01	-.13321E-01	-.34167E-02	-.18661E-01
72	.21837E-01	-.15487E-02	.15420E-01	-.12919E-01	-.34616E-02	-.18440E-01
74	.21505E-01	-.14780E-02	.14883E-01	-.12394E-01	-.34844E-02	-.18073E-01
76	.21035E-01	-.15033E-02	.14294E-01	-.11711E-01	-.34789E-02	-.17518E-01
78	.20565E-01	-.15286E-02	.13705E-01	-.11027E-01	-.34734E-02	-.16962E-01
80	.19771E-01	-.15165E-02	.12967E-01	-.10229E-01	-.34351E-02	-.16142E-01
82	.18783E-01	-.14820E-02	.12139E-01	-.93609E-02	-.33772E-02	-.15163E-01
84	.17775E-01	-.14474E-02	.11311E-01	-.84932E-02	-.33192E-02	-.14184E-01
86	.16807E-01	-.14129E-02	.10483E-01	-.76254E-02	-.32613E-02	-.13205E-01
88	.1595[illegible]E-01	-.13867E-02	.98860E-02	-.69345E-02	-.32407E-02	-.12310E-01
90	.15[illegible]71E-01	-.13725E-02	.96[illegible]57E-02	-.65019E-02	-.32747E-02	-.11537E-01

Wavelength = 1.0 um

l/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
92	.14630E-01	-.13583E-02	.93654E-02	-.60693E-02	-.33086E-02	-.10763E-01
94	.13970E-01	-.13442E-02	.91051E-02	-.56368E-02	-.33426E-02	-.99902E-02
96	.13310E-01	-.13283E-02	.88216E-02	-.52156E-02	-.33241E-02	-.92468E-02
98	.12651E-01	-.13047E-02	.84375E-02	-.48440E-02	-.30781E-02	-.86323E-02
100	.11993E-01	-.12811E-02	.80535E-02	-.44725E-02	-.28322E-02	-.80179E-02
102	.11335E-01	-.12575E-02	.76694E-02	-.41009E-02	-.25862E-02	-.74034E-02
104	.10677E-01	-.12339E-02	.72854E-02	-.37293E-02	-.23403E-02	-.67890E-02
106	.96439E-02	-.11898E-02	.63522E-02	-.29988E-02	-.16650E-02	-.60221E-02
108	.86775E-02	-.12221E-02	.56184E-02	-.24018E-02	-.10732E-02	-.52245E-02
110	.77720E-02	-.13144E-02	.50534E-02	-.19176E-02	-.55703E-03	-.44070E-02
112	.68666E-02	-.14066E-02	.44884E-02	-.14334E-02	-.40887E-04	-.35895E-02
114	.59951E-02	-.14739E-02	.37364E-02	-.57216E-03	.23616E-03	-.26119E-02
116	.53448E-02	-.14975E-02	.31548E-02	.14158E-03	.37620E-03	-.18372E-02
118	.50753E-02	-.14535E-02	.30177E-02	.33392E-03	.40683E-03	-.15514E-02
120	.48458E-02	-.14094E-02	.28806E-02	.52626E-03	.43746E-03	-.12656E-02
122	.46557E-02	-.13558E-02	.27366E-02	.69107E-03	.45069E-03	-.10498E-02
124	.45259E-02	-.12821E-02	.25825E-02	.83264E-03	.46185E-03	-.90827E-03
126	.44506E-02	-.11269E-02	.24013E-02	.98160E-03	.56597E-03	-.85481E-03
128	.44592E-02	-.11174E-02	.22133E-02	.11202E-02	.45280E-03	-.89436E-03
130	.46832E-02	-.11810E-02	.22313E-02	.12392E-02	.36100E-03	-.94335E-03
132	.53085E-02	-.12804E-02	.27085E-02	.13244E-02	.50328E-03	-.93304E-03
134	.60429E-02	-.13244E-02	.27820E-02	.14775E-02	.47365E-03	-.13648E-02
136	.68156E-02	-.14328E-02	.28449E-02	.16345E-02	.44484E-03	-.18110E-02
138	.76151E-02	-.16113E-02	.29389E-02	.17883E-02	.43465E-03	-.22260E-02
140	.84146E-02	-.17899E-02	.30328E-02	.19420E-02	.42446E-03	-.26410E-02
142	.92284E-02	-.19618E-02	.31598E-02	.18331E-02	.22987E-03	-.32421E-02
144	.10151E-01	-.20389E-02	.31593E-02	.16960E-02	-.10160E-04	-.40735E-02
146	.11334E-01	-.18815E-02	.27947E-02	.17920E-02	-.15212E-03	-.52775E-02
148	.13232E-01	-.17170E-02	.20947E-02	.26636E-02	-.42264E-03	-.66950E-02
150	.14564E-01	-.15213E-02	.18610E-02	.32519E-02	-.78214E-03	-.74272E-02
152	.15178E-01	-.12846E-02	.22144E-02	.33915E-02	-.12347E-02	-.73790E-02
154	.16355E-01	-.94799E-03	.26338E-02	.35016E-02	-.18831E-02	-.77942E-02
156	.16004E-01	-.61883E-03	.24854E-02	.35764E-02	-.21250E-02	-.73959E-02
158	.14702E-01	-.33157E-03	.22601E-02	.36623E-02	-.20839E-02	-.62788E-02
160	.12945E-01	-.15838E-03	.26963E-02	.38373E-02	-.18327E-02	-.42838E-02
162	.10567E-01	-.37037E-04	.16575E-02	.44485E-02	-.10053E-02	-.26819E-02
164	.83799E-02	.13855E-03	.81117E-03	.47327E-02	-.46912E-03	-.14146E-02
166	.66527E-02	.39502E-03	.58138E-03	.45215E-02	-.44848E-03	-.49631E-03
168	.70477E-02	.61458E-03	.90438E-03	.52002E-02	-.55011E-03	.45509E-04
170	.76253E-02	.91175E-03	.11608E-02	.57477E-02	-.65384E-03	.28286E-03
172	.86594E-02	.13206E-02	.14038E-02	.64565E-02	-.80787E-03	.29533E-03
174	.10933E-01	.19618E-02	.17411E-02	.80225E-02	-.11370E-02	.15702E-03
176	.16958E-01	.36713E-02	.20918E-02	.11993E-01	-.18892E-02	-.91174E-03
178	.37538E-01	.34366E-02	-.55579E-02	.17634E-01	-.17023E-02	-.44467E-04
180	.78128E-01	.58208E-10	-.24905E-01	.24905E-01	-.29104E-10	.39662E-02

Table 7

Real refractive index = 1.384
Imaginary refractive index = 6.725E-3

Scattering cross section = 3.205E-4 cm*cm
Extinction cross section = 5.623E-4 cm*cm
Single scattering albedo = 0.570

Wavelength = 3.8 um
1/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
0	.22614E+04	.00000E+00	.22506E+04	.22506E+04	.00000E+00	.22398E+04
2	.65987E+03	-.26886E-02	.65675E+03	.65665E+03	-.46762E-03	.65353E+03
4	.55037E+01	-.43580E-02	.55037E+01	.53788E+01	-.58399E-03	.53788E+01
6	.35768E+00	-.53769E-02	.35767E+00	.25237E+00	-.47469E-03	.25237E+00
8	.21186E+00	-.65986E-02	.21185E+00	.11315E+00	-.42886E-03	.11315E+00
10	.12803E+00	-.79627E-02	.12803E+00	.32861E-01	-.44445E-03	.32859E-01
12	.79000E-01	-.85453E-02	.78998E-01	-.67785E-02	-.40608E-03	-.67798E-02
14	.59027E-01	-.77593E-02	.59026E-01	-.61774E-02	-.24912E-03	-.61779E-02
16	.49534E-01	-.89640E-02	.49533E-01	-.17107E-01	-.29485E-03	-.17108E-01
18	.42902E-01	-.98995E-02	.42901E-01	-.22448E-01	-.30420E-03	-.22449E-01
20	.38294E-01	-.10418E-01	.38293E-01	-.22694E-01	-.27885E-03	-.22695E-01
22	.34008E-01	-.10086E-01	.34007E-01	-.20459E-01	-.24649E-03	-.20460E-01
24	.29721E-01	-.97534E-02	.29720E-01	-.18225E-01	-.21412E-03	-.18226E-01
26	.45770E-01	-.84322E-02	.45759E-01	-.37424E-01	-.20668E-03	-.37434E-01
28	.10064E+00	-.52231E-02	.10060E+00	-.97543E-01	-.24682E-03	-.97581E-01
30	.87163E-01	-.52164E-02	.87066E-01	-.84216E-01	-.22036E-03	-.84302E-01
32	.66600E-01	-.51013E-02	.66463E-01	-.63706E-01	-.15349E-03	-.63820E-01
34	.45356E-01	-.49319E-02	.45198E-01	-.42643E-01	-.79804E-04	-.42763E-01
36	.34951E-01	-.63717E-02	.34799E-01	-.31834E-01	-.18064E-03	-.31939E-01
38	.27321E-01	-.69527E-02	.27181E-01	-.23997E-01	-.20942E-03	-.24086E-01
40	.20870E-01	-.68176E-02	.20747E-01	-.17588E-01	-.18166E-03	-.17659E-01
42	.14619E-01	-.58465E-02	.14524E-01	-.11765E-01	-.91531E-04	-.11811E-01
44	.13349E-01	-.66465E-02	.13275E-01	-.10070E-01	-.17282E-03	-.10106E-01
46	.12326E-01	-.71428E-02	.12265E-01	-.87127E-02	-.23719E-03	-.87371E-02
48	.11050E-01	-.71107E-02	.10996E-01	-.72966E-02	-.26490E-03	-.73077E-02
50	.99196E-02	-.66780E-02	.98687E-02	-.61668E-02	-.27315E-03	-.61723E-02
52	.93056E-02	-.64123E-02	.92540E-02	-.54765E-02	-.29777E-03	-.54838E-02
54	.89263E-02	-.62226E-02	.88724E-02	-.49859E-02	-.32982E-03	-.49984E-02
56	.85470E-02	-.60328E-02	.84909E-02	-.44953E-02	-.36187E-03	-.45130E-02
58	.78848E-02	-.55968E-02	.78214E-02	-.38718E-02	-.36847E-03	-.38921E-02
60	.73776E-02	-.52261E-02	.73072E-02	-.33786E-02	-.37347E-03	-.34009E-02
62	.70918E-02	-.49696E-02	.70156E-02	-.30547E-02	-.38079E-03	-.30788E-02
64	.68061E-02	-.47130E-02	.67240E-02	-.27308E-02	-.38811E-03	-.27567E-02
66	.75396E-02	-.43350E-02	.74538E-02	-.31860E-02	-.38265E-03	-.32259E-02
68	.79354E-02	-.38157E-02	.78463E-02	-.34958E-02	-.35478E-03	-.35466E-02
70	.57164E-02	-.30634E-02	.56220E-02	-.21451E-02	-.27973E-03	-.21784E-02
72	.53238E-02	-.33387E-02	.52248E-02	-.14839E-02	-.33481E-03	-.15223E-02
74	.51885E-02	-.35854E-02	.50898E-02	-.10030E-02	-.36502E-03	-.10540E-02
76	.49576E-02	-.35492E-02	.48642E-02	-.59846E-03	-.33496E-03	-.66521E-03
78	.49906E-02	-.34618E-02	.48769E-02	-.45490E-03	-.38860E-03	-.51671E-03
80	.48856E-02	-.33247E-02	.47649E-02	-.27931E-03	-.39847E-03	-.33969E-03
82	.46979E-02	-.31578E-02	.45780E-02	-.84490E-04	-.38206E-03	-.14557E-03
84	.45101E-02	-.29909E-02	.43911E-02	.11033E-03	-.36566E-03	.48549E-04
86	.43223E-02	-.28240E-02	.42042E-02	.30515E-03	-.34925E-03	.24267E-03
88	.41681E-02	-.26735E-02	.40525E-02	.48137E-03	-.33110E-03	.41939E-03
90	.40630E-02	-.25644E-02	.39523E-02	.63041E-03	-.31040E-03	.57067E-03

Wavelength = 3.8 um
l/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
92	.39580E-02	-.24502E-02	.38520E-02	.77946E-03	-.28970E-03	.72195E-03
94	.38529E-02	-.23361E-02	.37518E-02	.92850E-03	-.26900E-03	.87323E-03
96	.37410E-02	-.22213E-02	.36448E-02	.10718E-02	-.24727E-03	.10185E-02
98	.35997E-02	-.21042E-02	.35085E-02	.11899E-02	-.22111E-03	.11379E-02
100	.34584E-02	-.19870E-02	.33722E-02	.13081E-02	-.19494E-03	.12572E-02
102	.33171E-02	-.18698E-02	.32359E-02	.14262E-02	-.16877E-03	.13765E-02
104	.31758E-02	-.17527E-02	.30996E-02	.15444E-02	-.14261E-03	.14959E-02
106	.29658E-02	-.16016E-02	.28930E-02	.16326E-02	-.10180E-03	.15787E-02
108	.28393E-02	-.14876E-02	.27680E-02	.17006E-02	-.77066E-04	.16434E-02
110	.27795E-02	-.14033E-02	.27081E-02	.17536E-02	-.65212E-04	.16948E-02
112	.27197E-02	-.13189E-02	.26483E-02	.18067E-02	-.53359E-04	.17463E-02
114	.27167E-02	-.12333E-02	.26386E-02	.18519E-02	-.53976E-04	.17888E-02
116	.27152E-02	-.11513E-02	.26312E-02	.18903E-02	-.54634E-04	.18242E-02
118	.26806E-02	-.10773E-02	.25963E-02	.19207E-02	-.47432E-04	.18520E-02
120	.26460E-02	-.10032E-02	.25615E-02	.19511E-02	-.40231E-04	.18798E-02
122	.25743E-02	-.91859E-03	.24870E-02	.19661E-02	-.26885E-04	.18894E-02
124	.24844E-02	-.83036E-03	.23922E-02	.19744E-02	-.92030E-05	.18901E-02
126	.24959E-02	-.78256E-03	.23992E-02	.20297E-02	.87727E-06	.19407E-02
128	.25073E-02	-.73475E-03	.24063E-02	.20850E-02	.10958E-04	.19912E-02
130	.25187E-02	-.68694E-03	.24134E-02	.21403E-02	.21038E-04	.20417E-02
132	.25301E-02	-.63913E-03	.24204E-02	.21956E-02	.31118E-04	.20923E-02
134	.25407E-02	-.58542E-03	.24217E-02	.22506E-02	.42319E-04	.21385E-02
136	.25412E-02	-.53596E-03	.24130E-02	.22811E-02	.48854E-04	.21604E-02
138	.25318E-02	-.49135E-03	.23949E-02	.22871E-02	.50608E-04	.21585E-02
140	.25223E-02	-.44675E-03	.23768E-02	.22931E-02	.52363E-04	.21566E-02
142	.24519E-02	-.39358E-03	.23045E-02	.22457E-02	.53442E-04	.21080E-02
144	.23668E-02	-.34459E-03	.22194E-02	.21814E-02	.53335E-04	.20442E-02
146	.23153E-02	-.31625E-03	.21643E-02	.21357E-02	.50976E-04	.19956E-02
148	.22638E-02	-.28791E-03	.21092E-02	.20900E-02	.48617E-04	.19471E-02
150	.23540E-02	-.26967E-03	.22018E-02	.21874E-02	.49291E-04	.20475E-02
152	.25868E-02	-.26063E-03	.24432E-02	.24289E-02	.53082E-04	.22978E-02
154	.25489E-02	-.21823E-03	.24050E-02	.23961E-02	.52056E-04	.22660E-02
156	.25539E-02	-.18504E-03	.24157E-02	.24095E-02	.54215E-04	.22857E-02
158	.25816E-02	-.15667E-03	.24520E-02	.24470E-02	.58044E-04	.23322E-02
160	.26092E-02	-.12830E-03	.24884E-02	.24844E-02	.61872E-04	.23788E-02
162	.24702E-02	-.93023E-04	.23372E-02	.12519E-02	.57013E-04	.22349E-02
164	.23913E-02	-.66097E-04	.22451E-02	.22858E-02	.55332E-04	.21570E-02
166	.24294E-02	-.51555E-04	.22736E-02	.23456E-02	.59805E-04	.22094E-02
168	.24674E-02	-.37012E-04	.23022E-02	.24053E-02	.64278E-04	.22618E-02
170	.24176E-02	-.22206E-04	.22304E-02	.23646E-02	.62538E-04	.22024E-02
172	.23603E-02	-.82793E-05	.21353E-02	.23068E-02	.57183E-04	.21111E-02
174	.24647E-02	.19367E-05	.21718E-02	.24034E-02	.52231E-04	.21455E-02
176	.27813E-02	.20351E-04	.22936E-02	.26871E-02	.41897E-04	.22546E-02
178	.52149E-02	.23046E-04	.18809E-02	-.18588E-02	.24906E-04	.40745E-02
180	.10671E-01	.45475E-12	.65789E-03	-.65789E-03	.45475E-12	.83698E-02

Table 8

Real refractive index = 1.107
Imaginary refractive index = 0.1245

Scattering cross section = 2.999E-4 cm*cm
Extinction cross section = 5.653E-4 cm*cm
Single scattering albedo = 0.531

Wavelength = 10.6 um
1/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
0	.31074E+03	.00000E+00	.31065E+03	.31065E+03	.00000E+00	.31055E+03
2	.92166E+02	-.91748E-03	.92166E+02	.92060E+02	-.12156E-01	.92060E+02
4	.90720E+01	-.15406E-02	.90720E+01	.89805E+01	-.10190E-01	.89805E+01
6	.27451E+01	-.19559E-02	.27451E+01	.26663E+01	-.84039E-02	.26663E+01
8	.10913E+01	-.22783E-02	.10913E+01	.10236E+01	-.68889E-02	.10236E+01
10	.31117E+00	-.24526E-02	.31117E+00	.23814E+00	-.57923E-02	.23814E+00
12	.23879E+00	-.15359E-02	.23879E+00	.23386E-01	-.62570E-02	.23386E-01
14	.15275E+00	-.21283E-03	.15275E+00	-.14430E+00	-.63790E-02	-.14430E+00
16	.72704E-01	-.12834E-02	.72700E-01	-.72213E-01	-.47106E-02	-.72214E-01
18	.44375E-01	-.16953E-02	.44371E-01	-.43921E-01	-.36339E-02	-.43922E-01
20	.26048E-01	-.18201E-02	.26045E-01	-.25650E-01	-.26165E-02	-.25651E-01
22	.23024E-01	-.24313E-02	.23022E-01	-.22555E-01	-.24648E-02	-.22555E-01
24	.31459E-01	-.32786E-02	.31457E-01	-.30806E-01	-.31351E-02	-.30806E-01
26	.17908E-01	-.17861E-02	.17907E-01	-.17520E-01	-.16205E-02	-.17521E-01
28	.15927E-01	-.27240E-02	.15926E-01	-.15420E-01	-.14516E-02	-.15420E-01
30	.13928E-01	-.33850E-02	.13927E-01	-.13337E-01	-.12552E-02	-.13337E-01
32	.11873E-01	-.31415E-02	.11872E-01	-.11309E-01	-.96883E-03	-.11309E-01
34	.98178E-02	-.28979E-02	.98172E-02	-.92804E-02	-.68247E-03	-.92805E-02
36	.77625E-02	-.26544E-02	.77622E-02	-.72522E-02	-.39612E-03	-.72524E-02
38	.66632E-02	-.25012E-02	.66629E-02	-.61557E-02	-.21786E-03	-.61558E-02
40	.59378E-02	-.23834E-02	.59377E-02	-.54237E-02	-.81895E-04	-.54237E-02
42	.52125E-02	-.22656E-02	.52124E-02	-.46917E-02	.54067E-04	-.46916E-02
44	.47555E-02	-.21694E-02	.47554E-02	-.42230E-02	.14884E-03	-.42229E-02
46	.43263E-02	-.20755E-02	.43262E-02	-.37815E-02	.23936E-03	-.37815E-02
48	.39038E-02	-.19789E-02	.39037E-02	-.33478E-02	.32665E-03	-.33478E-02
50	.35461E-02	-.18576E-02	.35460E-02	-.29897E-02	.38274E-03	-.29897E-02
52	.31885E-02	-.17363E-02	.31884E-02	-.26315E-02	.43883E-03	-.26315E-02
54	.28713E-02	-.16234E-02	.28712E-02	-.23141E-02	.48783E-03	-.23141E-02
56	.26574E-02	-.15320E-02	.26574E-02	-.21006E-02	.51871E-03	-.21006E-02
58	.24436E-02	-.14405E-02	.24436E-02	-.18871E-02	.54959E-03	-.18871E-02
60	.22298E-02	-.13491E-02	.22298E-02	-.16736E-02	.58046E-03	-.16736E-02
62	.20632E-02	-.12664E-02	.20632E-02	-.15068E-02	.60464E-03	-.15068E-02
64	.19111E-02	-.11864E-02	.19111E-02	-.13543E-02	.62677E-03	-.13543E-02
66	.17590E-02	-.11064E-02	.17590E-02	-.12018E-02	.64889E-03	-.12018E-02
68	.16529E-02	-.10395E-02	.16529E-02	-.10956E-02	.66362E-03	-.10956E-02
70	.15491E-02	-.97320E-03	.15491E-02	-.99172E-03	.67798E-03	-.99171E-03
72	.14536E-02	-.91075E-03	.14536E-02	-.89448E-03	.69378E-03	-.89447E-03
74	.14087E-02	-.87150E-03	.14087E-02	-.83777E-03	.71840E-03	-.83776E-03
76	.13638E-02	-.83226E-03	.13638E-02	-.78107E-03	.74302E-03	-.78106E-03
78	.13146E-02	-.78947E-03	.13146E-02	-.72596E-03	.75885E-03	-.72595E-03
80	.12566E-02	-.73942E-03	.12566E-02	-.67410E-03	.75670E-03	-.67409E-03
82	.11987E-02	-.68937E-03	.11987E-02	-.62225E-03	.75455E-03	-.62224E-03
84	.11408E-02	-.63932E-03	.11408E-02	-.57039E-03	.75239E-03	-.57039E-03
86	.11094E-02	-.60235E-03	.11094E-02	-.53677E-03	.75995E-03	-.53677E-03
88	.10843E-02	-.56839E-03	.10843E-02	-.50736E-03	.76974E-03	-.50736E-03
90	.10591E-02	-.53443E-03	.10591E-02	-.47794E-03	.77954E-03	-.47794E-03

Wavelength = 10.6 um
1/a = 300/60 um

CTA	P11	P12	P22	P33	P43	P44
92	.10410E-02	-.50392E-03	.10410E-02	-.45645E-03	.78695E-03	-.45645E-03
94	.10228E-02	-.47341E-03	.10228E-02	-.43496E-03	.79437E-03	-.43496E-03
96	.10045E-02	-.44370E-03	.10045E-02	-.41462E-03	.79972E-03	-.41462E-03
98	.98548E-03	-.41748E-03	.98548E-03	-.39928E-03	.79617E-03	-.39928E-03
100	.96643E-03	-.39126E-03	.96643E-03	-.38393E-03	.79262E-03	-.38393E-03
102	.94738E-03	-.36505E-03	.94738E-03	-.36859E-03	.78907E-03	-.36859E-03
104	.92833E-03	-.33883E-03	.92833E-03	-.35325E-03	.78552E-03	-.35325E-03
106	.90928E-03	-.31261E-03	.90928E-03	-.33790E-03	.78197E-03	-.33790E-03
108	.89023E-03	-.28639E-03	.89023E-03	-.32256E-03	.77842E-03	-.32256E-03
110	.89449E-03	-.26992E-03	.89449E-03	-.31859E-03	.79063E-03	-.31859E-03
112	.90256E-03	-.25505E-03	.90256E-03	-.31649E-03	.80543E-03	-.31649E-03
114	.91088E-03	-.24027E-03	.91088E-03	-.31453E-03	.82037E-03	-.31453E-03
116	.92435E-03	-.22751E-03	.92435E-03	-.31545E-03	.83820E-03	-.31545E-03
118	.93782E-03	-.21476E-03	.93782E-03	-.31637E-03	.85604E-03	-.31637E-03
120	.93682E-03	-.20002E-03	.93682E-03	-.31284E-03	.86001E-03	-.31284E-03
122	.88858E-03	-.17883E-03	.88858E-03	-.29478E-03	.81868E-03	-.29478E-03
124	.84033E-03	-.15763E-03	.84033E-03	-.27672E-03	.77735E-03	-.27672E-03
126	.79209E-03	-.13644E-03	.79209E-03	-.25866E-03	.73602E-03	-.25866E-03
128	.80783E-03	-.12688E-03	.80783E-03	-.26195E-03	.75344E-03	-.26195E-03
130	.84862E-03	-.12188E-03	.84862E-03	-.27361E-03	.79384E-03	-.27361E-03
132	.88941E-03	-.11688E-03	.88941E-03	-.28526E-03	.83424E-03	-.28526E-03
134	.88798E-03	-.10692E-03	.88798E-03	-.28373E-03	.83450E-03	-.28373E-03
136	.88219E-03	-.96456E-04	.88219E-03	-.28084E-03	.83061E-03	-.28084E-03
138	.87976E-03	-.86390E-04	.87976E-03	-.27905E-03	.82984E-03	-.27905E-03
140	.90986E-03	-.80215E-04	.90986E-03	-.28785E-03	.85930E-03	-.28785E-03
142	.93995E-03	-.74040E-04	.93995E-03	-.29666E-03	.88876E-03	-.29666E-03
144	.95125E-03	-.67221E-04	.95125E-03	-.29964E-03	.90030E-03	-.29964E-03
146	.91451E-03	-.58755E-04	.91451E-03	-.28772E-03	.86602E-03	-.28772E-03
148	.87778E-03	-.50290E-04	.87778E-03	-.27581E-03	.83174E-03	-.27581E-03
150	.84104E-03	-.41824E-04	.84104E-03	-.26389E-03	.79745E-03	-.26389E-03
152	.86353E-03	-.36883E-04	.86353E-03	-.27067E-03	.81916E-03	-.27067E-03
154	.90416E-03	-.33020E-04	.90416E-03	-.28318E-03	.85800E-03	-.28318E-03
156	.94479E-03	-.29157E-04	.94479E-03	-.29568E-03	.89685E-03	-.29568E-03
158	.97702E-03	-.25270E-04	.97702E-03	-.30563E-03	.92762E-03	-.30563E-03
160	.10088E-02	-.21381E-04	.10088E-02	-.31546E-03	.95799E-03	-.31546E-03
162	.10447E-02	-.17624E-04	.10447E-02	-.32655E-03	.99218E-03	-.32655E-03
164	.11051E-02	-.14676E-04	.11051E-02	-.34537E-03	.10497E-02	-.34537E-03
166	.11656E-02	-.11728E-04	.11656E-02	-.36420E-03	.11072E-02	-.36420E-03
168	.11976E-02	-.90329E-05	.11976E-02	-.37416E-03	.11377E-02	-.37416E-03
170	.11715E-02	-.68580E-05	.11715E-02	-.36598E-03	.11129E-02	-.36598E-03
172	.11454E-02	-.46831E-05	.11454E-02	-.35780E-03	.10881E-02	-.35780E-03
174	.11193E-02	-.25081E-05	.11193E-02	-.34961E-03	.10633E-02	-.34961E-03
176	.15869E-02	-.14935E-05	.13138E-02	-.76882E-03	.75278E-03	-.49566E-03
178	.21685E-02	-.74677E-06	.15591E-02	-.12867E-02	.37639E-03	-.67729E-03
180	.27500E-02	-.28422E-13	.18045E-02	-.18045E-02	.14552E-10	-.85892E-03

Table 7

Real refractive index = 1.107
Imaginary refractive index = 0.1245

Scattering cross section = 4.13E-5 cm*cm
Extinction cross section = 7.35E-5 cm*cm
Single scattering albedo = 0.561

Wavelength = 10.6 um
1/a = 30/37.5 um

CTA	P11	P12	P22	P33	P43	P44
0	.27533E+02	.00000E+00	.27121E+02	.27121E+02	.00000E+00	.26708E+02
2	.22769E+02	-.16215E-02	.22650E+02	.22547E+02	-.11478E-01	.22428E+02
4	.15743E+02	-.17620E-02	.15743E+02	.15641E+02	-.11250E-01	.15641E+02
6	.78270E+01	-.12719E-02	.78270E+01	.77790E+01	-.49737E-02	.77790E+01
8	.27622E+01	-.24398E-02	.27622E+01	.26907E+01	-.71974E-02	.26907E+01
10	.11833E+01	.52533E-04	.11833E+01	.61682E+00	-.10383E-01	.61681E+00
12	.74681E+00	.22023E-02	.74680E+00	-.13420E+00	-.12090E-01	-.13421E+00
14	.58765E+00	.20731E-02	.58764E+00	-.87043E-01	-.10880E-01	-.87052E-01
16	.42850E+00	.19439E-02	.42848E+00	-.39882E-01	-.96711E-02	-.39890E-01
18	.27017E+00	.91329E-03	.27015E+00	-.15874E-01	-.76172E-02	-.15881E-01
20	.13637E+00	-.47454E-03	.13635E+00	-.10154E-02	-.49672E-02	-.10201E-02
22	.13152E+00	-.52445E-05	.13151E+00	.61683E-01	-.26465E-02	.61680E-01
24	.10523E+00	-.98887E-03	.10523E+00	.59359E-01	-.19964E-02	.59357E-01
26	.65830E-01	-.20046E-02	.65827E-01	.30148E-01	-.17429E-02	.30147E-01
28	.15029E-01	-.21569E-02	.15027E-01	-.90162E-02	-.11835E-02	-.90163E-02
30	.91284E-02	-.21040E-02	.91270E-02	-.87513E-02	-.80512E-03	-.87512E-02
32	.72291E-02	-.20149E-02	.72281E-02	-.68637E-02	-.55628E-03	-.68636E-02
34	.62192E-02	-.19059E-02	.62183E-02	-.58639E-02	-.41107E-03	-.58636E-02
36	.52093E-02	-.17969E-02	.52085E-02	-.48641E-02	-.26585E-03	-.48636E-02
38	.44533E-02	-.16887E-02	.44525E-02	-.41083E-02	-.13962E-03	-.41078E-02
40	.38930E-02	-.15856E-02	.38923E-02	-.35465E-02	-.40324E-04	-.35460E-02
42	.35449E-02	-.14929E-02	.35441E-02	-.32014E-02	.16046E-04	-.32009E-02
44	.31968E-02	-.14002E-02	.31960E-02	-.28563E-02	.72415E-04	-.28558E-02
46	.28560E-02	-.13121E-02	.28552E-02	-.25134E-02	.13277E-03	-.25130E-02
48	.25247E-02	-.12266E-02	.25240E-02	-.21758E-02	.19547E-03	-.21754E-02
50	.22143E-02	-.11221E-02	.22138E-02	-.18663E-02	.24218E-03	-.18661E-02
52	.20157E-02	-.10560E-02	.20153E-02	-.16676E-02	.27457E-02	-.16676E-02
54	.18680E-02	-.10072E-02	.18676E-02	-.15193E-02	.30045E-03	-.15194E-02
56	.17203E-02	-.95840E-03	.17200E-02	-.13710E-02	.32633E-03	-.13712E-02
58	.15256E-02	-.87976E-03	.15253E-02	-.11791E-02	.34809E-02	-.11793E-02
60	.13766E-02	-.81541E-03	.13763E-02	-.10323E-02	.36418E-03	-.10324E-02
62	.12869E-02	-.77210E-03	.12866E-02	-.94364E-03	.37452E-03	-.94366E-03
64	.11972E-02	-.72878E-03	.11968E-02	-.85496E-03	.38486E-03	-.85492E-03
66	.11244E-02	-.69408E-03	.11241E-02	-.77421E-03	.40737E-03	-.77417E-03
68	.10583E-02	-.66005E-03	.10580E-02	-.70057E-03	.42825E-03	-.70053E-03
70	.98550E-03	-.61451E-03	.98522E-03	-.63577E-03	.42512E-03	-.63569E-03
72	.91269E-03	-.56898E-03	.91243E-03	-.57096E-03	.42200E-03	-.57084E-03
74	.85489E-03	-.52997E-03	.85468E-03	-.51444E-03	.42732E-03	-.51434E-03
76	.81660E-03	-.49936E-03	.81648E-03	-.46884E-03	.44342E-03	-.46883E-03
78	.78543E-03	-.46916E-03	.78528E-03	-.43144E-03	.45728E-03	-.43138E-03
80	.75308E-03	-.44049E-03	.75294E-03	-.39984E-03	.46016E-03	-.39977E-03
82	.72002E-03	-.41273E-03	.71991E-03	-.37173E-03	.45645E-03	-.37169E-03
84	.68696E-03	-.38498E-03	.68688E-03	-.34362E-03	.45274E-03	-.34360E-03
86	.67310E-03	-.36335E-03	.67305E-03	-.32337E-03	.46442E-03	-.32337E-03
88	.65711E-03	-.34197E-03	.65709E-03	-.30472E-03	.47054E-03	-.30473E-03
90	.63155E-03	-.31887E-03	.63153E-03	-.28578E-03	.46332E-03	-.28578E-03

Wavelength = 10.6 um
l/a = 30/37.5 um

CTA	P11	P12	P22	P33	P43	P44
92	.60598E-03	-.29577E-03	.60596E-03	-.26683E-03	.45609E-03	-.26683E-03
94	.60468E-03	-.28122E-03	.60467E-03	-.25748E-03	.46883E-03	-.25748E-03
96	.61304E-03	-.27056E-03	.61303E-03	-.25266E-03	.48837E-03	-.25266E-03
98	.59121E-03	-.25143E-03	.59120E-03	-.23902E-03	.47820E-03	-.23902E-03
100	.56937E-03	-.23230E-03	.56937E-03	-.22538E-03	.46803E-03	-.22538E-03
102	.56043E-03	-.21663E-03	.56043E-03	-.21640E-03	.46912E-03	-.21640E-03
104	.57298E-03	-.20674E-03	.57297E-03	-.21519E-03	.48900E-03	-.21519E-03
106	.55684E-03	-.18693E-03	.55683E-03	-.20418E-03	.48292E-03	-.20418E-03
108	.54736E-03	-.17277E-03	.54735E-03	-.19707E-03	.48030E-03	-.19707E-03
110	.54376E-03	-.16327E-03	.54375E-03	-.19324E-03	.48103E-03	-.19324E-03
112	.54016E-03	-.15377E-03	.54016E-03	-.18942E-03	.48176E-03	-.18942E-03
114	.53631E-03	-.14155E-03	.53631E-03	-.18514E-03	.48284E-03	-.18514E-03
116	.53320E-03	-.13034E-03	.53320E-03	-.18153E-03	.48397E-03	-.18153E-03
118	.53168E-03	-.12279E-03	.53168E-03	-.17945E-03	.48497E-03	-.17945E-03
120	.53015E-03	-.11524E-03	.53015E-03	-.17738E-03	.48598E-03	-.17738E-03
122	.52323E-03	-.10524E-03	.52323E-03	-.17340E-03	.48219E-03	-.17340E-03
124	.51327E-03	-.93818E-04	.51327E-03	-.16840E-03	.47561E-03	-.16840E-03
126	.51547E-03	-.87620E-04	.51547E-03	-.16816E-03	.47910E-03	-.16816E-03
128	.51767E-03	-.81421E-04	.51767E-03	-.16791E-03	.48259E-03	-.16791E-03
130	.51987E-03	-.75223E-04	.51987E-03	-.16767E-03	.48608E-03	-.16767E-03
132	.52207E-03	-.69024E-04	.52207E-03	-.16742E-03	.48957E-03	-.16742E-03
134	.52017E-03	-.61377E-04	.52017E-03	-.16598E-03	.48906E-03	-.16598E-03
136	.51942E-03	-.55390E-04	.51942E-03	-.16514E-03	.48928E-03	-.16514E-03
138	.52026E-03	-.51211E-04	.52026E-03	-.16501E-03	.49065E-03	-.16501E-03
140	.52110E-03	-.47033E-04	.52110E-03	-.16489E-03	.49203E-03	-.16489E-03
142	.52121E-03	-.42836E-04	.52121E-03	-.16462E-03	.49258E-03	-.16462E-03
144	.52099E-03	-.38631E-04	.52099E-03	-.16429E-03	.49274E-03	-.16429E-03
146	.52077E-03	-.34427E-04	.52077E-03	-.16396E-03	.49291E-03	-.16396E-03
148	.52055E-03	-.30222E-04	.52055E-03	-.16363E-03	.49308E-03	-.16363E-03
150	.52033E-03	-.26017E-04	.52033E-03	-.16330E-03	.49325E-03	-.16330E-03
152	.52018E-03	-.21911E-04	.52018E-03	-.16300E-03	.49348E-03	-.16300E-03
154	.52120E-03	-.19279E-04	.52120E-03	-.16323E-03	.49456E-03	-.16323E-03
156	.52222E-03	-.16647E-04	.52222E-03	-.16346E-03	.49565E-03	-.16346E-03
158	.52324E-03	-.14016E-04	.52324E-03	-.16369E-03	.49673E-03	-.16369E-03
160	.52426E-03	-.11384E-04	.52426E-03	-.16391E-03	.49782E-03	-.16391E-03
162	.52011E-03	-.94992E-05	.52011E-03	-.16257E-03	.49392E-03	-.16257E-03
164	.51500E-03	-.77524E-05	.51500E-03	-.16094E-03	.48910E-03	-.16094E-03
166	.50989E-03	-.60057E-05	.50989E-03	-.15931E-03	.48428E-03	-.15931E-03
168	.50478E-03	-.42589E-05	.50478E-03	-.15768E-03	.47946E-03	-.15768E-03
170	.50559E-03	-.28142E-05	.50559E-03	-.15791E-03	.48025E-03	-.15791E-03
172	.52362E-03	-.17120E-05	.52362E-03	-.16352E-03	.49739E-03	-.16352E-03
174	.59047E-03	-.11861E-05	.59047E-03	-.18436E-03	.56087E-03	-.18436E-03
176	.67696E-03	-.76863E-06	.67696E-03	-.21133E-03	.64299E-03	-.21133E-03
178	.82001E-03	-.38088E-06	.71675E-03	-.35919E-03	.49372E-03	-.25593E-03
180	.10391E-02	-.71054E-14	.68168E-03	-.68168E-03	.72760E-11	-.32424E-03